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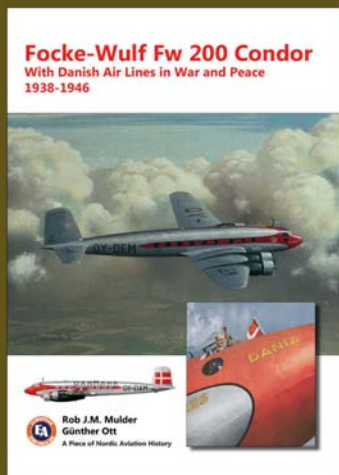
The modern journal of classic aeroplanes and the history of flying

issue no 7

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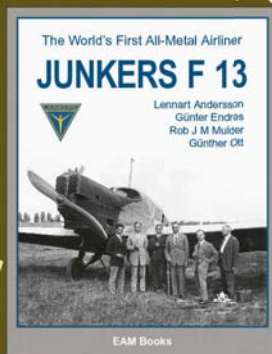
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The modern journal of classic aeroplanes and the history of flying

Editor's Letter

ONE OF THE joys of putting together *TAH* is the opportunity it gives me to dig deep into subjects that may have been inhabiting the backroads of my mind for years, but about which I had only rather vague notions. When reader and former Fleet Air Arm aviator David "Shorty" Hamilton asked *TAH* to look into the seemingly unlikely use of U-2s on aircraft carriers, I jumped at the chance to get "Dragon Lady" specialist Chris Pocock to relate not only what was already known, but to update it using recently-declassified CIA documents; the result is a fascinating insight into the spookier side of Cold War operations, all of which was new to me.

There were other discoveries too. Charles Lindbergh was nearly thrown out of the US Army Air Service for lying — that I did not know at all — and Eric Gordon England's mischievous antics in Germany a matter of days before the outbreak of World War One were known only to very few until the rediscovery late last year of F. Warren Merriam's manuscript of some of his fellow aviators' memoirs, our second exclusive instalment of which begins on page 38.

Importantly, you — our readers — are letting us know what *you* want to see; we're listening, so keep the ideas coming. I learnt a lot from this issue; I hope you will too!

FRONT COVER A superb example of the masterful work of the doyen of air-to-air photographers, CHARLES E. BROWN; up close and personal with a Blackburn Beverley in 1955. The big transport was used for the 1955 Fahud Airlift; the full story starts on page 102.

BACK COVER: TOP LEFT *The Northrop F-15 Reporter*; TOP RIGHT *A U-2 on a carrier? With those wings? Chris Pocock's feature begins on page 24*; MAIN IMAGE One of a series of gorgeous Kodachromes taken by MIKE HOOKS of Sabena Sikorsky S-55s in Brussels in 1955.

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correspondence

Letters to The Editor



Er, that's the wrong way round, shurely? "Shorty" Hamilton refuels a Victor tanker from his Sea Vixen in April 1962 — see his letter on this page.

Role reversal

SIR — Richard Riding's *There I Was* article in *TAH6*, with the Victor, has reminded me of an incident when I was CO of No 899 Sqn, RNAS Yeovilton (Sea Vixen FAW.1). We were undertaking trials with the Flight Refuelling Ltd "buddy pack", a self-contained refuelling system carried under the starboard wing of the Vixen, replacing the droptank. As all our refuelling tests were done from other Vixens, this day in April 1962 I had arranged trials with an RAF Valiant tanker of No 214 Sqn to see if there were any problems with refuelling from a much larger aircraft, at altitude. My plug-ins, at 30,000ft, went smoothly, however, with no difficulties.

When I was satisfied, and before returning to base, I asked the Valiant pilot if he would "like a go", and he thought it a great idea. I streamed my drogue, flew as steadily as possible and, when he was plugged in, I checked my rear-view mirror; it was full of Valiant windscreen! Fortunately I had organised a chase Vixen to photo-

graph my efforts, and so that Valiant episode was also recorded. I sent a copy to Flight Refuelling Ltd, who put it in their company magazine.

David "Shorty" Hamilton North Rocks,
NSW, Australia

Nardi notes

SIR — Had I known that in 2013 you would publish a fine feature on the Nardi FN.333 (*The Riviera Touch, TAH4*), I should have asked Dr Elto Nardi (1910–1988) about it when I met him 26 years ago. Sadly, the last of the four brothers who created the company died on June 10, 1988, just as the last wartime FN.305 trainer emerged from restoration. Luckily other sources (including *Jane's*, more comfortable with reporting than history) shed light on the type conceived by his elder brothers Dr Ing Luigi (1900–1978) and Dr Ing Euse (1902–1951).

The 1952 maiden flight was made by Mario Stoppani, whose test career began in 1917 with the SVA. Stoppani flew the FN.333 for the final



Send readers' letters for publication to: Air Correspondence, *The Aviation Historian*, PO Box 962, Horsham RH12 9PP, UK, or (preferably) e-mail them to the Managing Editor at mickoakey@theaviationhistorian.com

display in his distinguished career at the airshow held on November 13, 1959, at Vergiate, the SIAI factory airfield.

According to the *Registro Aeronautico Italiano* (RAI) annual reports, the "prototypes and derivatives" overseen in 1954 by the Milan Territorial Direction (DT) included the FN.333N "three-seat touring amphibian" and FN.333S "single-engine four-seat touring amphibian derived from the previous type", both built by Nardi at Linate.

In 1955 the RAI reported that "the activity of the Nardi company has suffered a sudden halt following the destruction (which occurred during flight test during the tuning phase) of the single-engine prototype amphibian I-KISS". The accident — which claimed the life of popular glider and freelance test pilot Nello Valzania — occurred on January 24, 1955, when the aircraft entered an irrecoverable spin during stall trials with centre of gravity fully aft. Recent accounts attribute the accident to shifting ballast, but at the time the RAI emphasised that it led to

a redesign, with a closer aerodynamic study "supplemented by a significant number of tests on a windtunnel model". This drove the freshly hired Dr Ing Alessandro Brena radically to enlarge and reshape both fin and rudder.

Again according to the RAI, in 1955 Nardi had "begun construction of two copies of the new version, the first of which will most probably be completed in the coming [i.e. 1956] spring". This is referred to elsewhere as "Nardi FN.333 series 0, a revisited variant of the FN.333S" and presumably included abandoning the folding wing concept — if, indeed, it had been ever applied.

While I do not have the 1956 and 1957 reports, in 1958 the RAI noted Nardi as building a single "pre-series" aircraft. No mention is made of the FN.333W, nor is any Nardi activity ever reported under the Turin DT, as should have been the case had Fiat been involved.

This dovetails with *Jane's* entries. In 1953–54 the annual wrote that the FN.333 had flown on December 4, 1952, and that the FN.333S fold-



Nardi FN.333 prototype I-KISS.



AIR *correspondence*

ing-wing four-seater was under construction. By 1955–56, the latter is said to have flown and “the first production aircraft was expected to fly before the end of 1955”. In 1958–59 *Jane’s* stated for the first time that “production aircraft would be manufactured by Fiat in Turin”, only to be replaced by “SIAI-Marchetti at Sesto Calende” in the 1959–60 edition. The decision was probably influenced by Brena, who had left Nardi for SIAI, which intended to resume aircraft production after a ten-year hiatus.

Finally, in a 1982 interview Elto stated that Nardi built six FN.333 in all and that Fiat never built any. This means the published list must be revised to eliminate at least two airframes from the initial batches, possibly by matching the temporary I-RAIE and ‘G’ markings with permanent registrations I-EUST and I-ELYO.

Both narrative and list omit the anonymous FN.333 in SIAI factory finish held by the Milan Science and Technology Museum, first recorded on display by Leslie Hunt in 1974. In 1982 Elto identified this as the first prototype, a recollec-

tion supported by the window arrangement and rounded fins. Regrettably, it has spent the last decade in storage.

Gregory Alegi *Rome, Italy*

Suspiciously speedy

SIR — Further to Giulio Valdonio’s query re the Mach number of XH502’s transatlantic crossing, I also question the claimed 2hr 49min. When conducting tours around Duxford, I report Concorde G-AXDN’s fastest ever commercial crossing time from Fairford to Bangor, Maine, in 2hr 56min and the SR-71 record New York—London flight on September 1, 1974, of just under 1hr 55min prior to static display at the SBAC Farnborough airshow. How did a subsonic aircraft manage a faster flight than a Mach 2+ aircraft, even if it had help from the jetstream?

I’m greatly enjoying my subscription, having joined at the de Havilland Moth Club Rally at Woburn, and will definitely be renewing when the time comes.

David W. Lee *IEng MRAeS Kedington, Suffolk*

British Air Power in 1916 *As a postscript to our Echoes From Dawn Skies article in TAH6, which included a prescient letter written by Alec Ogilvie to his uncle, Sir George William Agnew MP, here’s the reply:*

February 18, 1916, Rougham Hall, Bury St Edmunds

My dear Alec,

Your letter of the 14th was sent on to me here, as I was unable to attend Parliament this week. I am always glad to hear from you, and often wish I could see more of you — but I suppose you have been very busy for the last 12 months: and I am always either in London or here.

I quite agree with you on the necessity for prodding up the Govt. in the matter of our air service, which in my opinion has been much neglected. Long ago they ought to have fixed up a special service with some responsible minister at the head of it, with a Commander in Chief and special staff — independent of War Office or Admiralty, to a large extent, except during operations in the field.

Nor do I think Parliament or the country would grudge the necessary outlay on making our Air Service supreme if that be possible. Doubtless the Germans have had a long start of us in this direction. For some years the War Office had held the opinion that large Airships were of little or no use from a military point of view. This may be true up to now, but as the beastly things can now drop bombs in the Midlands, they will probably in the near future do much injury to our munitions work etc. And it seems to me that the only good defence against them is to have Aeroplanes powerfully armed and capable of rising rapidly to attack the airships. I was sorry to miss the debate on this point two nights ago, but the subject is certain to be revived. And I think the Govt. got a bit of a fright, seeing so many members in real earnest about it. I belong to a committee of Liberal members formed to watch the Govt. closely on all matters, but especially to push on vigorously with the War. Balfour’s and Tennant’s replies to criticisms were very unconvincing and I am sure the House thought so.

Your affect. uncle,

George W Agnew

NEW FROM AIR-BRITAIN!

THE GRUMMAN AMPHIBIANS: Goose, Widgeon & Mallard

Fred J. Knight with Colin R. Smith

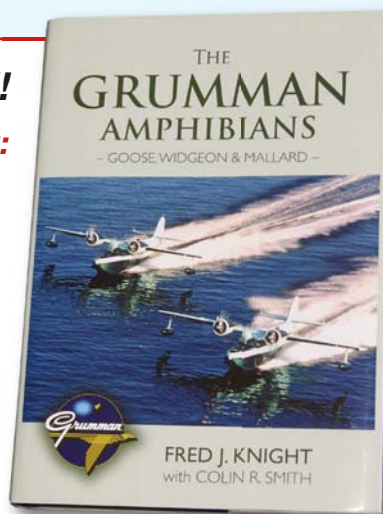
GRUMMAN'S DECISION to build an amphibian in which wealthy owners could commute from Long Island to New York's East River was a huge gamble. It would be the company's largest aircraft and its first for the civilian market.

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AIR correspondence

When airline travel was still a bit of an adventure: BOAC Bristol Britannia 312 G-AOVJ. See Derek O'Connor's rant on this page.



TAH ARCHIVE

Bring back BOAC

SIR — I just wanted to record how much I enjoyed reading Issue No 6 of *TAH*, and not least the excellent article by Hunting-Clan stewardess Angela Waller entitled *A Flying Safari*. I was never fortunate enough to have flown to Africa with Hunting-Clan. However, when I first went out to Kenya in mid-1960, I travelled economy-class in a wondrous BOAC Bristol Britannia, transiting through Rome, Khartoum and Entebbe. Even aiming-off for a little rose-tinted nostalgia, economy class in those days meant generously-proportioned seats with bags of leg-room and decent food, charmingly served by attentive cabin crew members who made time to chat. How unlike in today's "sardine" class, with its uncomfortably-narrow seats, dire food plonked down by overworked cabin staff and the dread prospect of finding oneself sandwiched between two members of the compul-

sively over-nourished community. Which is to say nothing of the demeaning and essentially futile security fandango that precedes every flight. Airline travel used to be a just a little bit of an adventure. Not any more.

Derek O'Connor Amersham, Buckinghamshire

Airfield amendment

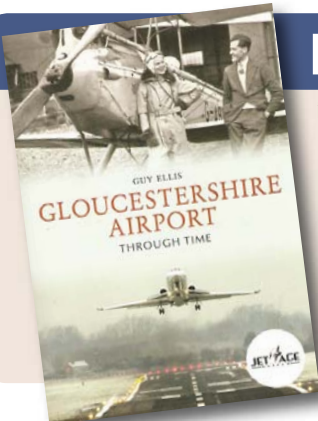
SIR — I suspect I'm not the first smart-alec to point out that the image of a Mosquito NF.19 taking off on pages 14–15 of *TAH6* is actually Woodford, not Hatfield.

The giveaways are the Lincolns (one of which seems to have jet engines outboard) and the Avro Tudor in the background.

Another great edition, though!

Malcolm Barratt Coventry, West Midlands

[Thanks for the correction, Malcolm. And actually you are the first smart-alec to point it out. Congratulations! — Ed]



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THANKS TO Amberley Books, we have three copies of Guy Ellis's new volume on Gloucestershire Airport (Staverton) to give away. With an RRP of £14.99 apiece, the well-illustrated 96-page softback Gloucestershire Airport Through Time charts the airfield's history with special emphasis, naturally, on the Gloster Aircraft Company — but also encompassing Smith's autoland systems and Cobham's inflight refuelling activities.

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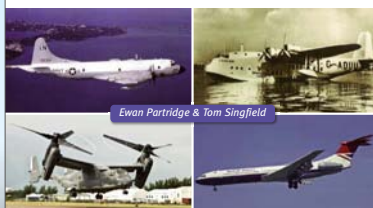
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SWISS MOVEMENT

In June 1971 Hawker Siddeley's Deputy Chief Test Pilot **JOHN FARLEY** was tasked with displaying the remarkable virtues of the Harrier to the Swiss Air Force. Set in a deep valley in the shadow of a steeply-rising Alpine mountain, Agno airfield provided the ideal amphitheatre in which to demonstrate the type's uniquely suitable abilities, as he relates

IN THE MID-1960s the Swiss Air Force was looking for a fighter to replace its ageing Hawker Hunter Mk 58s and de Havilland Venoms. One of the rules of the competition was that only aircraft that were in production at the start of the competition were eligible. This ruled out the Hawker Siddeley Harrier, production of which did not start until 1968.

Bill Bedford, who had close links with the Swiss Air Force from his days as a Dunsfold test pilot, was now Marketing Manager for the Harrier and he devised a characteristically cunning plan to allow the Harrier to be shown to the Swiss Air Force on the latter's home territory. Since the Swiss did not allow foreign military aircraft into the country, this would involve Hawker Siddeley taking a Harrier on loan from the Ministry of Defence, giving it a temporary civil registration — G-VSTO — and flying it to Lugano airfield in the south of Switzerland to coincide with a small-scale airshow the locals were planning in 1971.

TO SWITZERLAND

Accordingly, Bill and I visited the airfield a few weeks before the show, for me to see what would be involved. It was a picturesque little club airfield in the middle of the Lugano Prealp mountains, one of which, some 900ft (275m) high, began its ascent directly beside the single runway. I assured Bill I felt it was just the place to show off our remarkable V/STOL (Vertical/Short Take-Off and Landing) jet. The main runway had a loose surface dressing, so on arrival I would undertake a very slow, rather than vertical, landing, to keep detritus out of the



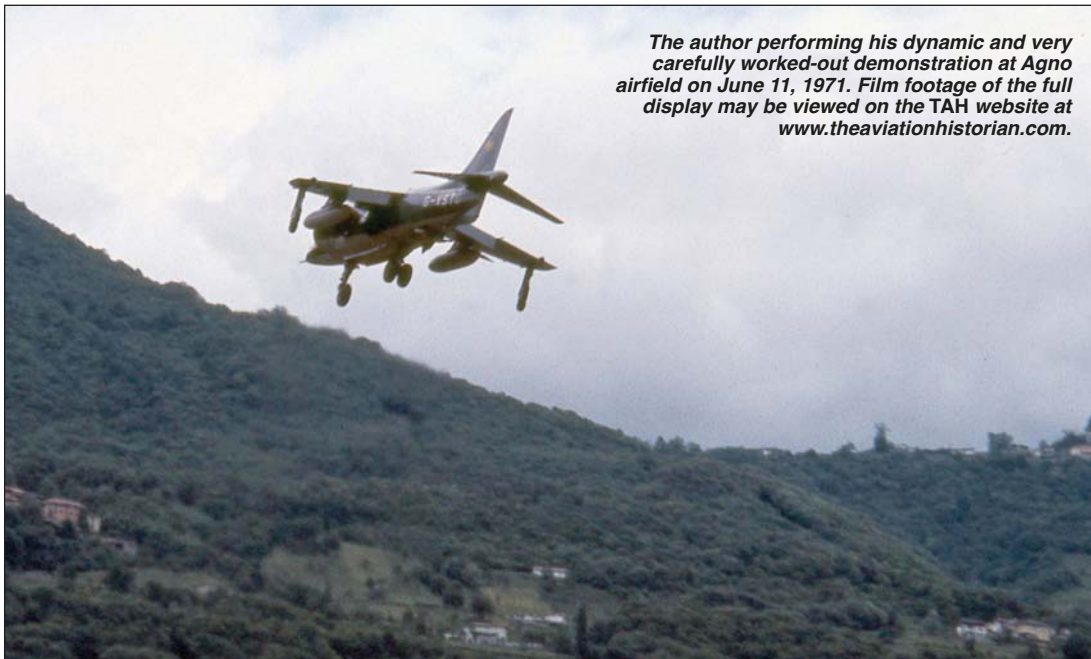
ALL PHOTOGRAPHS TAH ARCHIVE

ABOVE The author (centre) beside G-VSTO on a drizzly day in Switzerland in June 1971 with Hawker Siddeley Marketing Manager Bill Bedford (left) and Air Cdre Eric Burchmore CBE, who, in 1968, was appointed to lead the project to introduce the Harrier into RAF service. Bedford had been the test pilot for the first flight of the P.1127, forerunner of the Harrier.



Harrier GR.1 XV742 was lent to Hawker Siddeley by the Ministry of Defence for its demonstration tour to Switzerland in 1971, for which it had to be given a civil registration — resulting in the out-of-sequence but appropriate G-VSTO. Here John Farley positions the Harrier over a magnificent Alpine background to be photographed from the company's HS.125.

The author performing his dynamic and very carefully worked-out demonstration at Agno airfield on June 11, 1971. Film footage of the full display may be viewed on the TAH website at www.theaviationhistorian.com.



engine, but there were other pans and taxiways that would allow a fine rolling vertical take-off for the demonstration flights. Indeed, there was one that pointed across the runway directly at the sharply-rising mountain. Clearly this would be the way to start the demo, as no other fixed-wing aircraft could manage such a take-off.

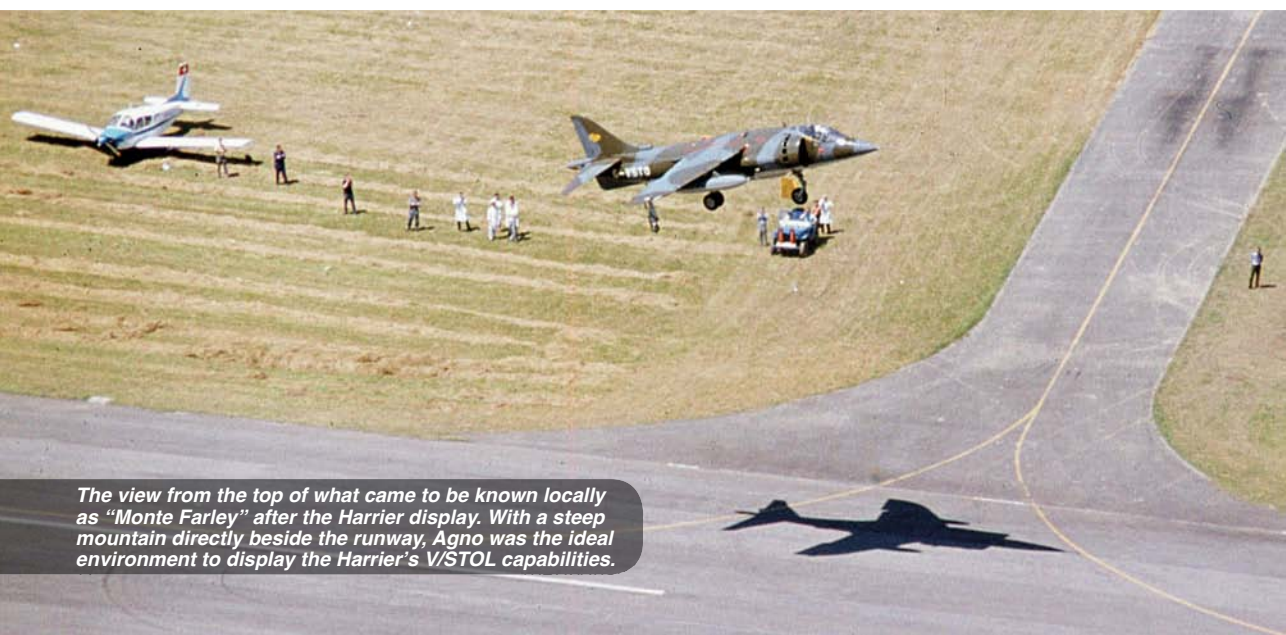
INTO THE DISPLAY

All the airfield facilities were on the opposite side of the runway to the mountain so the crowd would be able to watch all the V/STOL display manoeuvres against the background of the sharply-rising hill — an ideal stage compared to a normal large open flat airfield, such as those at

the big shows at Farnborough or Paris.

The display started with a rolling vertical take-off towards the hill and an accelerating transition up the hill. Then there were a few high-speed passes along the runway to show that the aircraft could do all the usual jet fighter stuff, before it was time to decelerate and demonstrate what was really special about the Harrier — its V/STOL capabilities.

First, a deceleration nearly to a stop, before a go-around (this showed that, in the Harrier, you are not committed to stop once you start slowing down), followed by a deceleration to a hover, before another climb away (to show you are not committed to a landing once you have stopped).



The view from the top of what came to be known locally as "Monte Farley" after the Harrier display. With a steep mountain directly beside the runway, Agno was the ideal environment to display the Harrier's V/STOL capabilities.



This was followed by a rapid deceleration from crowd-left into the hover, a turn on the spot and a sideways translation back to crowd-left. After stopping this sideways movement, I came back to crowd-centre, showing that you could hover nose-low or nose-high as long as the nozzles were adjusted to keep the thrust pointing vertically down towards the ground.

A spot-turn was followed by a translation forward and another rotation (or "pedal turn" as the US Marine Corps called it) with some 50kt of forward speed. This was to show the size of the slow-flight envelope and the type's docile handling, even with 90° of sideslip at mid-transition speeds, provided you kept the wing

angle-of-attack close to zero. This was followed by some backwards flying (to show tolerance to a tailwind in the hover) before a departure back up the hill.

MAKING THE MOST OF IT

As you may have deduced from some of my earlier manoeuvre-related comments, as a manufacturer's pilot I was not just trying to entertain the crowd but also wanted to demonstrate specific type-related matters to existing or future customers. Four decades ago the world of jet V/STOL operations was new to most people, including the squadron pilots who would soon be converting on to the Harrier, so I



TOP The Harrier was displayed at Agno as part of Switzerland's 1971 International Salon d'Aviation. The airfield, five miles south-west of Lugano, offered a runway 4,000ft (1,200m) in length and 100ft (30m) wide, the mountains surrounding it providing a natural amphitheatre, which the author exploited to the full.

LEFT On June 12 the Harrier was due to display at a show at nearby Grenchen. Although the show was cancelled owing to bad weather, the author nevertheless performed two display flights there in the Harrier — the only aircraft to do so.

designed the display to demonstrate to them specific piloting matters outside their normal flying experience. In this way, one hoped to give them confidence in the margins in stability and control that surrounded the normal everyday take-off and landing procedures that they would be using.

GETTING IT RIGHT

There are many general piloting issues associated with display and demonstration flying, but number one for me was pre-demo nerves and being afraid of failure. Not failure in terms of crashing but in terms of letting the side down by not performing as good a display as the aircraft deserved. Such nerves are far from all-bad, as they can be what makes you focus on the job in hand with every bit of concentration you can muster. In my case this meant I did not want to talk to anybody in the 30min or so before getting into the cockpit. I would escape

the company guests and shut myself away — often in my car near the flight line — while I went over in my mind what I had to do. The groundcrew probably realised what was going on as they never tried to interrupt me with idle chat. Indeed, I am sure some of them probably had similar concerns regarding their own vital role in preparing the aircraft.

Several times I was lucky to get away with making serious mistakes. These varied from going to put the pin in the ejection seat after flight and finding I had not taken it out earlier, through to not connecting my oxygen, which, while not critical at low level, was certainly indicative of poor performance on my part, to say the least. Mistakes of that type are often connected with becoming momentarily distracted, and such distractions are potential killers for anyone — from experienced professionals to new private pilots.

All display pilots sooner or later get the urge



With Switzerland's mountainous terrain, and airfields embedded in deep valleys, the Harrier appeared to be a natural choice for the nation's air force — but the remarkable V/STOL fighter did not qualify for inclusion in the procurement process, according to Switzerland's rather odd production cut-off stipulations.





"COFFIN CORNER": BILL BEDFORD'S SWISS NEAR-MISS



I ONCE NEARLY eliminated myself in an unscheduled demonstration in Switzerland, despite being up to scratch and in good demonstration practice. In the late 1950s we at Hawker were fighting hard to get the two-seat Hunter accepted as the Vampire replacement for the new advanced trainer for the RAF. To emphasise the suitability and docility of the aircraft, in 1959 we worked up a fizzy 7min programme of aerobatics that began with a roll after take-off and finished with a 10–13-turn smoking spin from some 18,000ft (5,500m). Recovery was made at never less than 6,000ft (1,830m); this gave a safety margin of more than 1,000ft (305m) in height on dive recovery. Unusually for the SBAC Show at Farnborough we had blue sky all that week, and the Hunter (G-APUX, as seen **ABOVE**) hit the headlines. With this experience, abundant practice and confidence, a few days later I took off for Switzerland to demonstrate the Hunter to the Swiss Air Force.

On approaching Emmen Aerodrome, near Lucerne, I reached an agreement with control to perform a demonstration on arrival. Thus the scene was set for an unscheduled, unplanned demonstration; nothing to worry about — I was in practice and raring to go! An unorthodox rapid let-down preceded the display sequence, which flowed effortlessly. The weather was perfect and Mount Pilatus provided a strikingly dramatic background. With the aerobatic sequence over, my Hunter smoked upwards to 18,000ft, skewing off-set from the centre of the airfield to enable the spectators to see the show without having to crane their necks vertically. I gave the familiar crisp control inputs for a spin; stick back, full port rudder, full outspin aileron — and she was away rotating, as hundreds of times before. Then I pushed hard forward to increase the rate of rotation, and just sat back monitoring the two single-pointer altimeters as they ticked off the height at a rate of descent of some 24,000ft/min (7,300m/min). I kept an eye on the r.p.m. and jetpipe temperature (JPT) and on occasion peeped out of the cockpit. No sweat. As 6,000ft came up I applied full starboard rudder and moved the stick laterally to port to give a fraction of inspin aileron. The spin stopped at once with the aircraft dead in line with the centre of Emmen airfield. But my brief feeling of professional pride was suddenly shattered — something was seriously amiss, and the ground abnormally close.

Adrenalin flooded my body as I realised I'd arrived at "Coffin Corner". Pull too hard and I'd had it; pull not hard enough and I'd had it. At this stage a calm clear voice came through in my mind. "Hawker Alpha, this is your guardian angel speaking, I have control. Select max-lift flap, ease the stick back to the edge of the buffet, pour on the power, don't panic, just pray — I'll try to save you, but this time it really is the limit . . . come on now, a bit more alpha . . . not too much or you'll overcook it. You might well sweat . . . you don't deserve it, but I think we're going to make it with a few hundred feet to spare. OK, let the aircraft run on down to treetop level and pull up with a climbing roll if you must, but just remember: you may be kidding the spectators that it was all part of the act, but you're not kidding me! Over and out". It was to be many years before my pride allowed me to admit this near-lethal mistake. I had simply forgotten to allow for terrain altitude [*Emmen's elevation is 1,400ft (430m) above mean sea level — Ed*].

One of the first ingredients of successful demonstration flying is a high-calibre pilot behind the stick. Brilliance on a test pilot's course and excellent academic qualifications will be of no avail whatsoever unless, as John Derry said, "the pilot has the necessary temperament and keenness on flying itself with a total dedication to his profession". This is no job for the man who shuts the hangar door abruptly at 1700hr in favour of his roses, golf clubs, vintage motor cars and an isolated life of domestic bliss. He has to become integrated with "his" aircraft until it is almost engraved on his very heart. (*Excerpted from the Winter 1977 issue of Cockpit Pictorial Review*) **BILL BEDFORD**

to improvise a manoeuvre in the middle of a display. Sadly this can mean travelling a well-trodden path to the cemetery. Surviving a personal experience that is sufficient to convince yourself that you should never do such a thing again is clearly a matter of luck.

My luck held on the day I was dumb enough to continue a high-speed aileron roll for an extra 360° because it seemed like a good idea at the time. I can still remember the excitement in the eyes of the company photographer when he came up to me afterwards and said how much he enjoyed the display and “especially that roll!” I can also remember the look on my boss’s face when he came in to my office afterwards, asking me what I thought I was up to! Most of all I remember raising the nose at the end of the roll and thinking how wide the runway looked at that moment.

NO HARRIERS – BUT MORE HUNTERS

As well as the classic displays flown at airshows, there are overseas sales tours which can be very demanding when operating with minimum resources. The regulation of display flying has also changed a lot over the years. For example, when I joined Hawker Siddeley in 1967, there were no height limits for any displays we chose to give when flying aeroplanes owned by the Ministry of Defence, and I can well remember how aggrieved I felt when the Ministry’s Flying



ABOVE The author demonstrates the Harrier cockpit to a Swiss Air Force pilot. The air arm comprised a mix of professional personnel and part-timers, the ratio being about a third full-timers to two-thirds reservists, with some 800 aircraft of various types on strength.

Orders for Contractors introduced them. Those were the days!

Regarding the Swiss Harrier demo, despite Bill Bedford’s best efforts, the rules of the competition prevailed and the Swiss chose the Northrop F-5. However, as the procurement process all took longer than expected they did buy another batch of Hunters to tide them over, so the trip was ultimately worthwhile!



COMING SOON Harrier to the USA: the AV-8A story

Twin towers of hot exhaust gas stream from G-VSTO’s rear nozzles as John executes part of his display routine at Agno. The day after his solo demonstration at Grenchen, the author flew three displays at Agno before heading back to the UK via Zürich.





ABOVE With airbrake fully deployed, the author brings G-VSTO alongside the HS.125 the company used as a support aircraft. Note the 100gal fuel tanks the Harrier carried throughout the tour. During the excursion to Switzerland G-VSTO made a total of 13 flights with virtually no maintenance other than filling up with fuel.



ABOVE As well as making the trip to Switzerland as G-VSTO in 1971, XV742 was used the same year for trials on the deliberately-cratered runway at West Freugh in Scotland, to evaluate the type's ability to operate from a heavily damaged airfield. The aircraft was lost during a weapons exercise while serving with No 233 OCU in October 1983.

LUCKY LINDY & THE UNBELIEVABLE TRUTH

Charles Lindbergh — and his furry friend Booster — on the bombing range at Kelly Field, near San Antonio, Texas, in 1925, when he was undergoing US Army Air Service training. Later known as “Lucky Lindy”, the young aviator had already gained much experience as a barnstormer by the time he joined the military.

MINNESOTA HISTORICAL SOCIETY

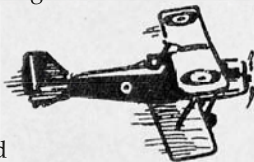


In 1927 Charles Lindbergh made the first solo transatlantic air crossing and became one of the most famous people in the world. Much less well-known is that, two years earlier, he had very nearly been thrown out of the US Army Air Service. So what had he done to incur the military's wrath? **FRED G. HERBERT** ponders the perils of being exceptional

IN EARLY 1925 the US Army Air Service came very close to dismissing Charles Lindbergh on charges of lying to superior officers. The Army's advanced flight-training programme at Kelly Field, Texas, thought it had good reason to drum the young aviator out of the military. The future pioneer might not have become an Army Pilot and would not have received a commission as a second-lieutenant, honours that Lindbergh had worked hard to be in a position to achieve.

Before joining the Army as a flight cadet, Charles Augustus Lindbergh Jr had been an engineering student at the University of Wisconsin. At college he did not apply himself, making an effort only at the subjects which interested him. His poor academic performance

resulted in his dismissal. Determined to succeed in the army training programme, Lindbergh worked hard to make top scores and, as a result, was academically more successful there than at any school he had ever attended.



While his fellow cadets were asleep at night, Lindbergh would study in the only after-hours lit room in the barracks — the latrine. When he moved from preliminary flight training at Brooks Field, near San

Antonio, Texas, to advanced training at nearby Kelly Field, Lindbergh was second in the class. Nevertheless, his instructors were about to dismiss him. There was no question about his airmanship; Lindbergh was an accomplished pilot before joining the Army. He had received preliminary flight training at a



Lindbergh was flying an American-built de Havilland DH-4M, similar to this example, on the day of the navigation exercise from Kelly Field in January 1925, the machine being referred to by Lindbergh simply as "No 23" in his own notes. He had flown the same aircraft in an "Aerial Distance Estimation" exercise on December 21, 1924. PHILIP JARRETT COLLECTION



“WHEN LINDBERGH REPORTED IN AT KELLY FIELD, HE WAS ASTONISHED TO

flying school in Nebraska and, significantly, had worked as a barnstormer, taking passengers for \$5 a ride at small country towns throughout the western USA, as well as performing aerobatics at airshows. By the time he joined the Army he had logged more flight hours than any other cadet in his unit. Only one flying instructor at Kelly Field had more flight hours logged than Lindbergh.

His army flying instructors recognised his piloting skills but had no choice — as they saw it — but to drop a liar from the programme. Integrity was, and still is, as important to a military aviator as airmanship.

THE NAVIGATION TEST

Lindbergh's problem arose from a navigation training flight on January 5, 1925. The cadets were to fly solo on a triangular course across Texas from Kelly Field. They would fly eastward for 67 miles (108km) to Gonzales, then south-easterly for 33 miles (53km) to Cuero, before turning to the north-west for 82 miles (132km) back to Kelly Field. They were to land at Gonzales and Cuero, where a flying instructor would document their time of arrival. Upon returning to Kelly Field, the cadets were to present the document that contained the instructors' endorsements. This flight would provide experience in navigating over large areas of undeveloped countryside with few towns, roads or other features that would serve as checkpoints. The instructors expected the cadets to wander off course and have to find

themselves by identifying positions on their maps and making proper course corrections. Flights like this were more of a pleasure than a trial for Lindbergh. The weather was good and the navigation problem was interesting but uncomplicated. His aircraft, an American-built de Havilland DH-4M, was comparatively modern and well-maintained.

The cadets took off at 5min intervals, and Lindbergh was third to leave. The first leg of the trip, to Gonzales, presented a challenge because the countryside was mostly uninhabited prairie with few landmarks. The only checkpoint that would give a pilot's place with precision was 57 miles (92km) from Kelly Field. The road running from Seguin to Gonzales came within half a mile (800m) of a winding river that twisted as it ran parallel to, and south of, the road. When the pilot identified the road from the air, he could follow it to Gonzales should

visibility became limited. However, the weather was good and flying direct to Gonzales was easy. Lindbergh had become a master at this type of navigating during his barnstorming days, when he flew using railway maps that could be bought at any drugstore. He was the first cadet to land at Gonzales and checked in with the flying instructor positioned there to verify the cadets' landings, before taking off for Cuero.

The second leg of the flight was even easier than the first. Initially, for 7 miles (11km), the





MAP BY MAGGIE NELSON

FIND HIMSELF IN HOT WATER; HE COULD NOT PRODUCE HIS ENDORSEMENT"

road to Cuero ran in the same direction as the flightpath. Following the road would give the magnetic course to follow for the rest of the second leg. The road wandered off to the east at one point but eventually came back to Cuero. It was the shortest leg of the flight and the easiest to navigate. Lindbergh flew direct to Cuero and landed — but could not find the flying instructor there to verify his arrival. There was no army aircraft or flying instructor anywhere to be found on the airfield. So he took off on the third leg of the trip to return to Kelly Field.

INTO HOT WATER

The return flight from Cuero to Kelly Field was a long stretch over sparsely-populated countryside. However, some small towns served as checkpoints and would verify Lindbergh's correct magnetic course to Kelly. Less than ten miles (16km) from Cuero, just north of the flightpath, was the small town of Lindenau, and 50 miles (80km) further on was another small town, Sutherland Springs, just south of a bend in a river. After an uneventful flight, Lindbergh landed back at Kelly Field.

His performance had been excellent. He had taken off third, had navigated well and was the first cadet to return. However, when he reported in at Kelly, he was astonished to find himself in hot water — he could not produce the Cuero instructor's endorsement indicating that he had landed there. The instructors were skeptical that he had found Cuero. They suggested that he had landed at some other small airport or had got lost and drifted around until he had managed to find his way back to Kelly Field. A distraught Lindbergh was told that he would be dismissed

from the flight programme if it was found that he had lied about the details of his flight.

All of the young aviator's hard work to excel during Army flight training now appeared to be in jeopardy. He knew he had flown the assignment perfectly and insisted that he had landed at Cuero, which was greeted with narrowed eyes by the instructors. To bolster his case Lindbergh began to make a drawing of the airfield at Cuero, showing the arrangement of the hangars and aircraft tie-down facilities to prove that he had been there. Before he had completed his sketch, however, the Kelly Field base operations office received a message from the instructor who was to check the pilots at Cuero. He reported that he had got lost that morning on the way to Cuero and had arrived very late. He had not been at Cuero when Lindbergh landed. With his honesty no longer in question, and to his great relief, Lindbergh remained in the programme.

THE REST IS HISTORY . . .

Of the 104 cadets that commenced the course at Brooks Field, only 19 successfully completed advanced training to receive the grade of second lieutenants in the Air Service Reserve Corps. Lindbergh stood first in the class.

In 1926 Linbergh was appointed chief pilot for the Robertson Aircraft Corporation, with which he flew air mail from St Louis, Missouri, to Chicago, Illinois. The following year Lindbergh took off from Roosevelt Field, New York, in the *Spirit of St Louis* and completed the first non-stop solo flight across the Atlantic, to become the most famous person in the world — despite very nearly having been drummed out of the Air Service only two years previously.



THE DRAGON LADY

goes to sea

With its remarkably long wings and notoriously tricky landing characteristics, the Lockheed U-2, nicknamed the "Dragon Lady", would seem to be a far-from-ideal candidate to operate from aircraft carriers. Nevertheless the CIA conducted extensive carrier trials — and operational missions — with the type during 1964–74. Seen here is one of the improved U-2Rs undergoing trials aboard the USS America in November 1969.



*In the long and distinguished history of the U-2, one episode remains something of an enigma; during 1964–74 Lockheed's famous spyplane operated from American aircraft carriers. This surprising capability was employed operationally only once, and its development was partly thanks to a British test pilot. Using declassified documents, U-2 specialist **CHRIS POCOCK** reveals how the CIA gave the "Dragon Lady" her sea legs*

AFTER CIA PILOT Francis Gary Powers was shot down over the Soviet Union on May 1, 1960, the Lockheed U-2 was dubbed "The Black Lady of Espionage" in the popular press. Moreover, the aircraft's newly-found notoriety now affected America's ability to secure permission from foreign governments to stage U-2 missions via the latter's airfields. But replacements for the long-winged high-flyer — the Mach-3 *Oxcart* and *Blackbird* aircraft, and reconnaissance satellites — were still in their infancy. In 1963 the U-2 was still busy flying important missions over China, Cuba, Tibet and South-east Asia.

To mitigate potential foreign basing problems, the CIA had already sponsored development of an inflight refuelling capability for the U-2. This extended the aircraft's endurance to more than

12hr, but was not popular with its pilots, who were already tasked with flying a machine with delicate handling qualities while wearing an uncomfortable pressure suit. Landing the U-2 was always a challenge, and to do so when fatigued after such long refuelled missions was even riskier. But if the U-2 could operate from America's aircraft carriers, the political problem would be sidestepped. These American-owned floating airbases could also provide more security for overflight missions; as surface-to-air-missiles were now proliferating, it became more important than ever for the U-2 to enter "denied territory" without any prior warning, either from radar or from "spies on the ground".

Clarence "Kelly" Johnson, designer of the U-2 and head of Lockheed's Advanced Development Programs department, known as "The Skunk





LEFT Lockheed test pilot Bob Schumacher (left) and legendary Lockheed designer Clarence "Kelly" Johnson beside one of the U-2Gs on the deck of the USS Ranger during the type's first landing trials in early 1964.

BELOW The first trials of a U-2 aboard an aircraft carrier were undertaken in August 1963, when an unmodified U-2A was lifted aboard the USS Kitty Hawk by crane at NAS North Island, San Diego. After the ship had left port, Schumacher took off and made four practice approaches before heading back to shore.

OPPOSITE A rare photograph of U-2A N315X approaching the fantail of the Kitty Hawk. The O.N.R. marking on the fin signified the Office of Naval Research. Civil registrations in the N--X series were applied to all CIA U-2s in the 1960s when they were engaged on test, training or ferry missions, but were removed for operational overflights.

Works", had first proposed carrier-basing for the type in 1957. Six years later the idea was revived, with the enthusiastic support of Jim Cunningham, a former US Marine Corps aviator with carrier flying experience, who was now the senior manager of the CIA's Office of Special Activities (OSA), which was running the U-2 programme.

PROJECT WHALE TALE

In April 1963 Johnson formally proposed the U-2 carrier conversion, to include a strengthened undercarriage and a tailhook. The following month Cunningham led a small top-secret study group that visited US Navy airfields and aircraft carriers in Florida. The Navy project officer was Captain Martin "Red" Carmody, who quickly became enthusiastic about the project. The study

group declared the idea to be feasible. Project *Whale Tale* was under way.

Thus it was that on the night of August 4, 1963, a CIA U-2 was flown into Naval Air Station (NAS) North Island at San Diego, and then lifted by crane on to the flight deck of the USS *Kitty Hawk* (CV-63). This was an unmodified aircraft, but it could take off from the carrier, then make some approaches and touch-and-goes to explore the new operating regime. The take-offs would be unassisted; the U-2's structure could not withstand the stress of a catapult take-off. In any case, the aircraft's high power-to-weight ratio already conferred a very short take-off roll. With a wind-over-deck of 30kt, the aircraft would very likely lift off in less than 500ft (152m).

With the ship's crew sworn to secrecy, the *Kitty*





Hawk steamed out of port under cover of darkness to a point south of San Clemente Island, to await daylight. Meanwhile, the 80ft (24m)-wingspan U-2 was towed along the angled deck and back, and lowered to the hangar deck, to check clearances. The Skunk Works had already designed a special fuselage cart with wheels that castored sideways, so that the U-2 could be correctly positioned on the carrier's elevators, which measured only 63ft x 52ft (19m x 16m). One wing hung over the seaward side of the elevator. Later, it was decided to modify the aircraft's main and tail undercarriage so that they could be manually rotated through 90°.

Johnson assigned experienced U-2 test pilot Bob Schumacher, previously a US Navy carrier pilot, to the project. In his private diary Johnson described what happened the next morning:

"I briefed about 20 Navy people on what we wanted to do, but it seems the captain on the bridge didn't get word, so we had several instances of going too fast, or too slow, in the wrong direction. With all of this, the aircraft took off in 321ft [98m] with no difficulty whatsoever. Schumacher made three approaches, and flying through turbulence aft of the carrier was no problem. But on the third approach, 'Schu' bounced, hit hard on the right wingtip, and picked the thing up just before coming to the end of the angled deck. After one more flyby to see that all the parts were on, he flew home."

This was clearly not going to be easy. As Cunningham had already noted: "Handling, launching and retrieval will always be a special operation, requiring considerable technical skill from both ground-support personnel and pilots". This was not to mention the disruption that top-secret U-2 operations would cause to the Navy's finely-honed carrier air wing operations. This

would include making space below deck for the processing and initial interpretation of the U-2's film — a highly-classified activity. Approval for U-2 carrier missions would be required at "the highest levels of the Department of Defense", Cunningham predicted.

From Schumacher's first approaches to the *Kitty Hawk*, it was obvious that the U-2's tremendous wing-lift would have to be dumped more efficiently if the aircraft was to be put down precisely where the arresting cables were situated on deck. Johnson experimented with various schemes in the low-speed windtunnel at Burbank to reduce the lift and the landing speed.

First he tried adding fixed slots in the flap, a design that Lockheed had used on the Lodestar light transport. But this required too great an angle of attack as the U-2 approached the carrier deck. Then he proposed a leading-edge slat extending for nearly the complete wingspan, as on the Lockheed JetStar. But the slat actuation mechanism stole fuel space in the wing, and resulted in a loss of some 400 nautical miles (740km) in range. Eventually, Johnson settled for hydraulically-operated wing spoilers, plus an increase in the flap travel (to 45° instead of 30°).

ENTER DETACHMENT G

During the winter of 1963–64 the Skunk Works modified two original U-2A models to U-2G carrier configuration. The tailhooks were modified examples of those fitted to the US Navy's North American T-2A jet trainers, mounted ahead of the tailwheel and attached to the strong framing which formed the engine mounts and wing attachment points. The pilot released the hook from the stowed position by pulling a T-handle in the cockpit. Small fairings were added in front, behind and on both sides of



ABOVE A North American T-2A Buckeye is prepared for launch during a training exercise. From November 1963 Detachment G's pilots used T-2As — and later T-2Bs — for training in carrier landing techniques and to obtain their "carquals" — carrier qualifications. The U-2 would prove to be rather different when it came to deck landings.

the hook. These reduced aerodynamic drag and coincidentally provided an anchor for a small plastic radome which could be fitted over the hook when it was not in use, thus preserving secrecy by hiding it from view.

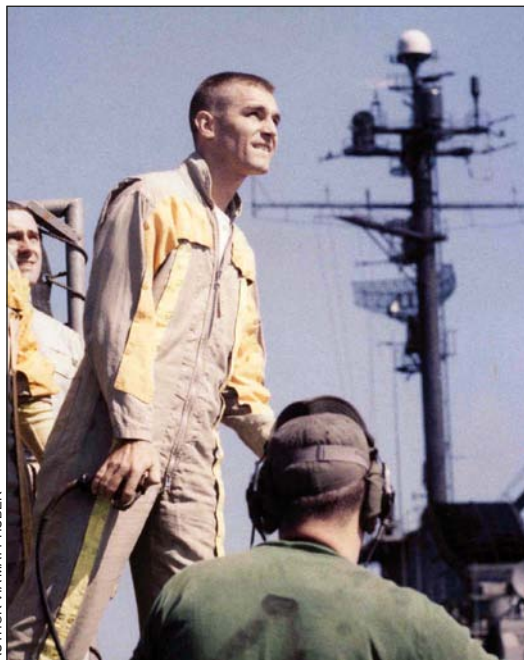
The single-strut undercarriage, empennage and fuselage bulkheads were beefed up to cope with the additional structural loads imposed by an arrested landing. Whereas Navy aircraft were built to withstand decelerations of up to 20ft/sec (6m/sec), the U-2 was designed for only a quarter of that load. To deflect the carrier's arresting cable from the undercarriage in the event that the hook failed to connect, metal framework was added to the undercarriage assembly and doors. A fuel-dump system was added: this was one of the many standard aircraft features that had been cut from the original U-2 design, in order to save weight and boost altitude. The total weight penalty for the carrier modifications was about 350lb (160kg).

In the meantime, a training programme for operational U-2 pilots was devised and implemented. The CIA's U-2 unit was designated "Detachment G". It consisted of eight pilots and some half-dozen aircraft, located at the remote North Base portion of Edwards AFB in California, but always ready to deploy anywhere in the world for operational missions. All of Det G's pilots would be carrier-qualified, including two RAF officers who were nearing the end of a three-year tour. In a secret agreement between the American and British governments, British pilots had been brought into the CIA's U-2 programme in 1958. Two of them had flown over the Soviet Union before the Powers incident ended such missions.

The Navy assigned one of its most experienced carrier aviators to Det G as a Landing Signals Officer (LSO). Lieutenant-Commander John Huber would be responsible for talking the U-2 down to a safe trap. First, though, he supervised carrier flight training for the Det G pilots. The first four were sent to NAS Monterey, California, in mid-November 1963 for initial check-out in the Navy's T-2A Buckeye tandem jet trainers. This group then moved on to NAS Pensacola in Florida and, when Huber declared them ready, to their first landings aboard the training carrier *USS Lexington* (CVS-16) in the Gulf of Mexico. The remaining four Det G pilots, together with Det G commander Colonel Bill Gregory and test pilot Schumacher, completed their carrier qualifications in the first six weeks of 1964.

Meanwhile, the two modified U-2Gs were test-flown. Mock arrester cables were painted on the runway at Det G's home base, and Schumacher flew Field Carrier Landing Practices (FCLPs) there on January 4, 1964. He was then sent to nearby NAS Lemoore to practise FCLPs in a T-2A. While he was gone, real cables were rigged on the runway at North Base, and a standard US Navy deck-landing mirror system using a Fresnel lens, or "meatball", was installed. Schumacher flew the first arrested U-2G landings there on January 30, before joining the Det G pilots still at NAS Pensacola for more T-2A practice.

There was much debate among the pilots about how to land the U-2 safely aboard a carrier. The consensus was that about 30kt of wind across the deck would be required. Since the U-2 normally landed at about 80kt, depending on fuel load, this would reduce the actual landing speed to about



ABOVE Trap! The U-2's hook catches the wire. It was quickly determined that only a single arrestor cable should be rigged for the U-2, to prevent damage to the aircraft's small tailwheel assembly. The cable was of smaller diameter than those usually used.

LEFT Lieutenant-Commander John Huber was the former US Navy carrier pilot assigned full-time to Detachment G as the unit's dedicated Landing Signals Officer (LSO). Huber would go on to become an invaluable part of the U-2 carrier programme.

50kt. It was trial-and-error all the way at North Base during the second half of February, as the Det G pilots began flying FCLPs in the U-2G.

TRIALS ABOARD THE RANGER

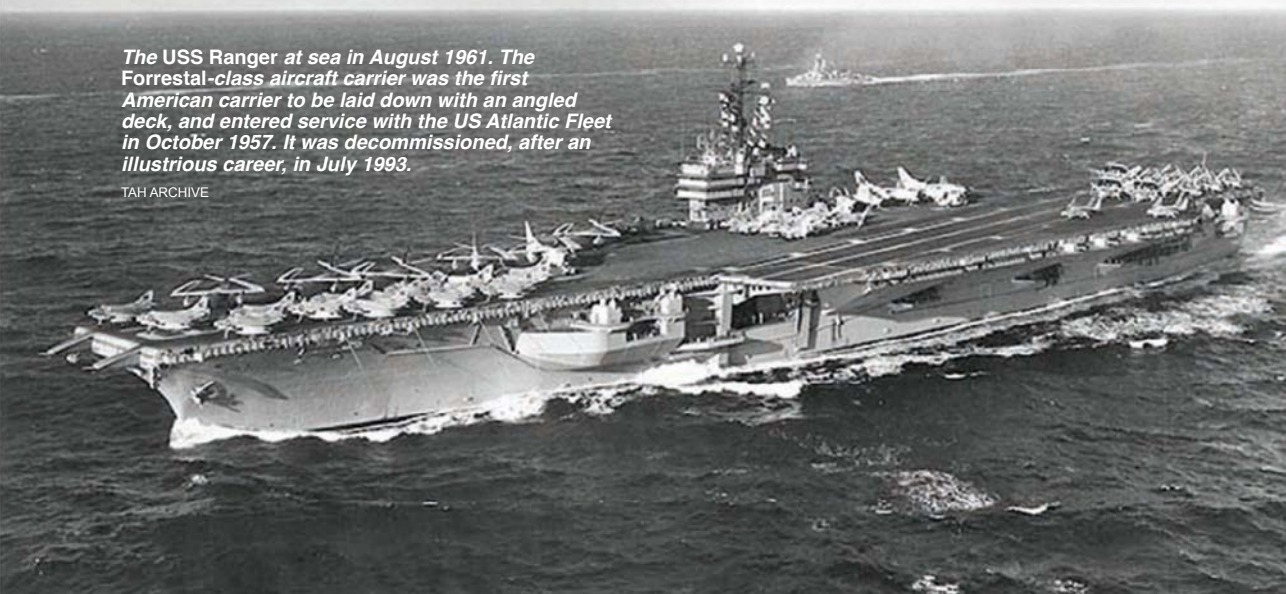
On February 29 Schumacher flew a U-2G from Edwards to the *USS Ranger* (CV-61), sailing off the southern California coast. First he made three touch-and-goes with the hook up, reporting turbulence as he approached the deck, leading to undesirable throttle adjustments. It was the same as he approached for a fourth time, with the hook down this time for a trap. As Schumacher crossed the fantail, he was too fast and a little high. The U-2 hit the deck hard and bounced. At the same time, the tailhook caught the third wire. The

aircraft slammed nose first into the deck. After minor repairs, Schumacher was able to fly it off the carrier the next day and back to Burbank for more serious attention.

The Navy suggested that the accident was due to the tension of the arrestor cables being too tight. But the U-2 group aboard the *Ranger* realised that turbulence during the aircraft's standard flat, slightly nose-low approach was the big problem. With their higher sink rates and more forgiving undercarriages, the Navy's own carrier aircraft avoided the updraught in the carrier's wake with their steeper approach. The solution was to reduce the carrier's speed, and therefore the wind over deck, to about 25kt. The updraught then flattened out below the approaching U-2.

The USS Ranger at sea in August 1961. The Forrestal-class aircraft carrier was the first American carrier to be laid down with an angled deck, and entered service with the US Atlantic Fleet in October 1957. It was decommissioned, after an illustrious career, in July 1993.

TAH ARCHIVE



On February 29, 1964, Bob Schumacher alighted on the USS Ranger in U-2G N808X to make the type's first trapped landing. It nearly ended in disaster when the aircraft bounced just as the hook caught the wire; the aircraft pitched forward and the nose hit the deck.



The Skunk Works repaired the damaged U-2G. As a precaution, one of the spring-loaded “pogos” that held the U-2’s wings up when it was on the ground was shortened and fixed under the nose to provide protection in case the aircraft pitched forward in the trap again. On March 2 Schumacher flew back to the carrier. This time he made five touch-and-go landings followed by five successful arrested landings.

Now it was the turn of the Det G pilots. Bob Ericson had just started his touch-and-goes when a Norwegian freighter approached the operating area. It would not go away, so the U-2 was waved off and flew to NAS North Island for the night. The next day, Jim Barnes flew out to the boat. On his first touch-and-go, his approach speed was 6–10kt lower than Schumacher and Huber had recommended. Barnes stalled at about 10ft (3m) just over the fantail. He jerked the throttle forward but it was too late. The aircraft hit the deck with the starboard wing low. The wingtip skid was torn off by one of the arresting cables. As the engine spooled up the U-2 became airborne again and just missed the island at mid-deck. Barnes somehow managed to climb away. The starboard aileron had been partly jammed upwards by the impact. Fighting to keep control, Barnes struggled back to North Base.

To prevent a similar accident in future, the Skunk Works added a reinforcing metal plate to the front of the wingtip skids and springs were added to their base. The “carquals” continued, until all of Det G’s pilots were proficient.

GOING LIVE: OPERATION FISH HAWK

It was not long before the OSA put its newly-acquired U-2 capability to practical use. In early May 1964 the *USS Ranger* set sail from San Francisco with only the ship’s crew, a half-dozen

McDonnell Douglas F-4 Phantom IIs, a few other aircraft and one escort destroyer. The rest of its usual embarked air wing stayed at home. But a U-2 staging kit, including a new camera, plus support personnel including photo-interpreters, was aboard. Operation *Fish Hawk* was under way.

The carrier was heading for the far southwestern reaches of the Pacific Ocean, and a reconnaissance objective that was politically very sensitive. The CIA had gained permission to overfly the new French nuclear test site in Polynesia. France had selected Mururoa Atoll to replace its nuclear test site in Algeria, which had been lost after the latter won independence from Paris. In April 1964 there were reports of a build-up of French troops and technical personnel in neighbouring Tahiti. Mururoa was thousands of miles from anywhere — an ideal target for a very covert carrier-launched sortie.

The US Navy insisted that the movement of the *USS Ranger* and its escort be completely secret. That meant radio silence for nearly three weeks. The OSA was obliged to come up with a covert teletype system that could handle the minimum requirements for ship-to-shore communications, as well as the deployed U-2 group’s communications with Project HQ. The Comms section of OSA designed a scheme that used a clandestine relay station in Panama.

On May 12, 1964, Det G pilots Jim Barnes and Al Rand flew the two U-2G models out to the *Ranger*. Eugene “Buster” Edens was the third pilot on the trip. In the greatest possible secrecy, the *Ranger* continued south-westwards and crossed the Equator on May 16. Three days later, when the *Ranger* was about 800 nautical miles (1,480km) from the French test area, Jim Barnes took off on a maximum-range-profile mission that would cover a large swathe of Pacific Ocean and atolls.



ABOVE LEFT & ABOVE In order to prevent the arrestor cables fouling the tailwheel on landing, metal grids which would deflect the cables were fitted to the U-2's tailwheel door.

LEFT A close-up of the red candy-striped tailhook attached to one of the two U-2G models that were transferred from the CIA to NASA in 1971. This example became NASA 708 and served until 1987, when it was retired and refurbished for display at NASA's Ames Research Center at Moffett Field.

Although France had announced its plan for nuclear tests in French Polynesia, the detailed plans were secret, and might involve locations throughout the 1,000-mile (1,610km) archipelago. For instance, the forward support base including an airfield and harbour was being constructed on Hao atoll, 280 miles (450km) north-west of Mururoa. For this reason, a new camera would be used which could provide high-resolution stereo imagery over a wide area. Named the Delta, it was derived from the panoramic camera in the first American reconnaissance satellites.

Barnes made a safe return to the boat. The film

was downloaded and processed on board. The CIA's photo-interpreters first examined the U-2's 70mm tracker film, to check whether all the targets had been covered. Then the Delta film was processed and examined. Cloud cover or haze obscured 45 per cent of the photography. Therefore a second mission was planned at Project HQ in Washington DC. The captain of the *USS Ranger*, Capt William E. Lemos, had already turned the ship for home, but was persuaded to pause for the second mission. This was successfully flown from the *Ranger* on May 22, with Al Rand at the controls. After the film was

THE CREW'S VIEW: BOB BACHOFNER, *USS RANGER*, MAY 1964

IN 1964 INTERIOR Communications Electrician Third Class (IC3) Bob Bachofner was serving in the Pilot Landing Aid Television (PLAT) Room aboard the *USS Ranger* (CV-61) during Operation *Fish Hawk*, the only operational use of a U-2 from a carrier in the type's history. Now living in Vancouver, Washington, Bob recalls his experiences of the U-2 aboard the *USS Ranger* exclusively for *TAH*:

"After pulling out of San Francisco and steaming for a number of days we went to flight quarters to recover one of the U-2s. Working in the PLAT Room we filmed the recovery on videotape. After the aircraft was secured aboard the ship two men, who may have been from the CIA — we didn't know who they were for sure — took the videotape and left. The ship proceeded to cross the Equator on May 16, 1964, when all of the crew became "shellbacks" — I still have the certificate hanging on my wall. A few days later we went to flight quarters and launched the U-2 we had aboard, and then recovered a second U-2. Before the launch the two guys that had taken the tape brought it back and we filmed the launch of the first U-2 and the landing of the second. This routine took place about every two days for about a week or so. I assumed there were only two aircraft but couldn't know for sure because there were no markings of any kind on them.

"Along with my fellow shipmates in the PLAT Room I watched all the flightdeck activity via our island-level camera and two deck-mounted cameras. During launch and recovery two or three men [*almost certainly a handling crew from Lockheed — Ed*] would come out on to the flight deck and hold on to the wingtips to steady the aircraft while the ship turned into the wind. Once this was accomplished they would let go and the U-2 would lift off the deck and ascend at a very steep angle until we could no longer follow it with the zoom lens on the island-mounted camera. When landing-on, the U-2 would settle on the deck of the ship like a butterfly, as we would typically have about 20kt of wind across the deck for both launch and recovery. Other than our group in the PLAT Room, the ship's crew never got to see anything — all hatches to the flightdeck were secured and even the flightdeck crew was not allowed on deck at that time. Two men were assigned to us in the PLAT Room and they would lock the door and hatches into the room when we were filming."

BOB BACHOFNER

processed and initially examined by the photo-interpreters, copies from both missions were flown by the Navy to Hawaii, and from there by courier jet to Eastman Kodak's processing facility in Rochester, New York.

The *USS Ranger* arrived back in San Francisco after a three-week absence. The U-birds were flown off before it reached port. Most of the ship's crew were unaware of the reason for their unusual Pacific cruise. They had been forbidden from taking pictures and discussing the deployment after they got home. Years later, one of the F-4 pilots recalled: "I never found out where we went except that we crossed the Equator and had a big 'shellback' ceremony. We flew several times during the cruise just for proficiency but only in the landing pattern. No TACAN locks and no radar returns — and no bingo [fuel range] fields! We were way out in the middle of nowhere".

Project HQ later told Det G commander Bill Gregory and his team that the results of this extraordinary excursion were highly successful. In late September Jim Cunningham was presented with a medal by the Deputy Director of Central Intelligence, Marshall Carter, for his key role in creating the U-2 carrier capability. A second pair of U-2s was modified to the U-2G carrier-capable configuration. (In 1965 another U-2 was modified. This one also had provision for inflight refuelling, and this became the only U-2H model.)

Not everyone was happy. Grumbling was heard from mid-level Navy personnel aboard the *USS Ranger* over the inconvenience. "We will do all this ourselves next time", one remarked. When the next potential carrier mission was suggested in late October, two Admirals in the Pentagon protested. It would unacceptably delay the *USS*

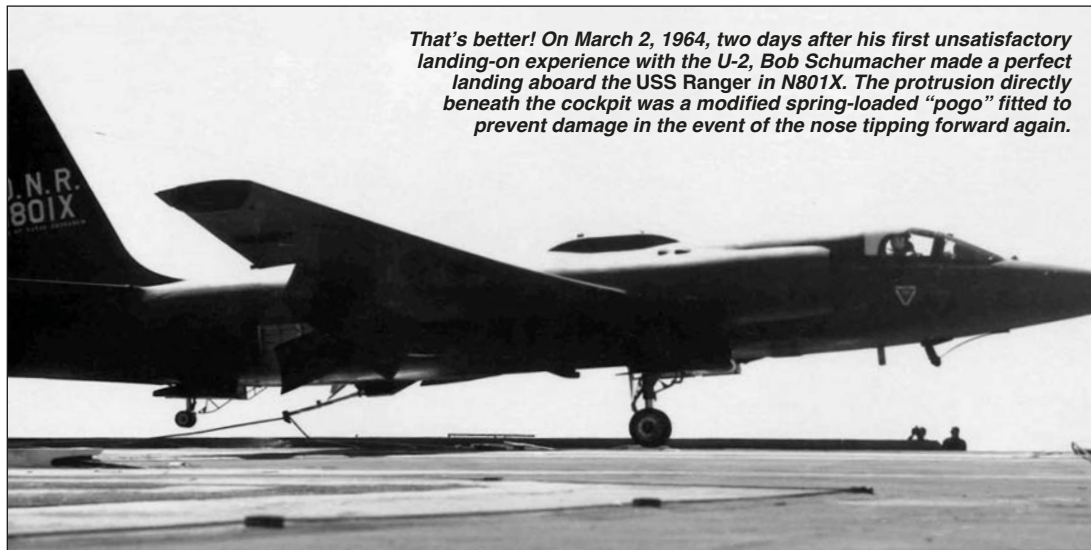
Saratoga (CV-60) from arriving on station with the Sixth Fleet in the Mediterranean, they said. Upon further discussion within the US Intelligence Board and the Joint Chiefs of Staff, the mission was cancelled. The OSA's plan to revisit the French nuclear test site in May 1965 was also rejected. (France eventually conducted its first test shot from Mururoa in July 1966.)

THE BRITISH CONTRIBUTION

"There were many people in the US Navy that did not want anything to do with the CIA, and particularly its U-2s", recalled Jim Cherbonneau, a former Det G pilot whose job it was to co-ordinate between Project HQ and the Admirals. However, Captain (later Rear Admiral) Carmody was still lending his support, and the Navy did continue to provide the basic carrier qualification course on the T-2A and the *USS Lexington* for new U-2 pilots, such as the four who joined Det G in mid-1964. These included two replacement British pilots, Sqn Ldr Basil Dodd and Flt Lt Martin Bee. Huber remained assigned to the CIA U-2 unit and the Navy sent a newly-qualified test pilot, Lt-Cdr Tom McMurtry, to join Det G in late 1964. With no carrier missions in the offing, McMurtry joined the roster of operational pilots, and Huber augmented the unit's operations staff.

The pilots maintained proficiency by undertaking FCLPs at North Base, where the Fresnel lens mirror system and arrester gear were retained on the runway. Gradually, a definitive carrier-landing technique evolved, thanks in large part to RAF officer Sqn Ldr Ivor Webster. Nicknamed "Chunky", Webster was a qualified test pilot whose flying credits included the Rolls-Royce Thrust Measuring Rig ("Flying Bedstead") for

That's better! On March 2, 1964, two days after his first unsatisfactory landing-on experience with the U-2, Bob Schumacher made a perfect landing aboard the USS Ranger in N801X. The protrusion directly beneath the cockpit was a modified spring-loaded "pogo" fitted to prevent damage in the event of the nose tipping forward again.





ABOVE One of the British pilots assigned to Detachment G, Sqn Ldr Ivor Webster, had plenty of experience with unusual and awkward aircraft, including Rolls-Royce's "Flying Bedstead", which made its first hops in July 1953. **BELOW** "Chunky" Webster played a major part in establishing standard operating procedures for U-2 carrier ops.

VTOL evaluation at the Royal Aircraft Establishment (RAE) at Bedford. Since arriving at North Base in 1961, his expertise and methodical approach had so impressed the management of the OSA that it had assigned him to engineering test flights and write-ups of the operating manuals at North Base.

Webster's method called for the pilot to fly a standard U-2 approach at 90kt, reducing to 82kt, slightly nose-down, using the "meatball" as his glidepath reference. (The Fresnel lens was depressed to guide the U-2 descending on a 2.3° glidepath, rather than the Navy's standard 3°.) When the aircraft was still 100–150ft (30–45m) from the fantail, this distance depending on the wind over deck, the LSO would call "Cut One!" This was the pilot's cue to retard the throttle to idle and ease the U-2's big control yoke back sufficiently to bring the nose up to about 1.5° angle-of-attack. Then, as the U-2 reached the fantail, the LSO would call "Cut Two!" This commanded the pilot to deploy the wing spoilers and pull back further on the yoke so that the aircraft's main and tail undercarriage would contact the deck simultaneously, as the tailhook engaged the cables.



Of course, regular naval aviators would throw a fit if asked to cut the power before engaging the cables. The special procedure adopted for the U-2 relied heavily on the judgment of the LSO, John Huber. "We pilots learned to trust him to the hilt", recalled former U-2 pilot Marty Knutson.

"When the LSO called 'Cut One' and the throttle was retarded, the pilot was committed, since the U-2's J75 engine spooled up quite slowly", Knutson explained. "If the 'cut' was made too early, the aircraft would be short and could strike the fantail. If the cut was too late, the aircraft would overshoot and would have to go around — if the engine power could be increased in time", he added.

While wind-over-deck was the crucial weather criterion, the sea state was also a factor. Pitch and roll limits were also established for the carrier. There were other peculiar provisions, too. Special 1in (2.5cm)-diameter arresting cables were substituted for the thicker ones that were usually fitted on the carriers. The arresting-gear weight setting for the U-2 was 10,000lb (4,535kg).

Although take-offs presented far fewer problems than landings, they could still be



ABOVE In 1968 the U-2R introduced a number of modifications to the sea-going *Dragon Lady*, including a longer wingspan, improved flaps and a more powerful Pratt & Whitney J75 engine. After mirror-landing trials with the new variant at North Base, it was tested aboard USS America off the coast of Virginia in November 1969, as seen here.

hazardous. They were made from the straight, not the angled, deck. A minimum 30kt wind-over-deck was required. The U-2 carrier operations manual noted: "The aircraft position will be determined by fuel load . . . the line-up point is critical due to the flow of air around the 'island'". The "pogos" that held the wings level on the ground, and fell away during take-offs, were not fitted for carrier operations. Instead, groundcrew held the wingtips level until the pilot applied power and the U-2 began accelerating.

STALL PROBLEMS

On April 26, 1965, Buster Edens was killed while flying an FCLP at Edwards when he entered a spin and ejected too low. He was the victim of wing-drop, an all-too-familiar problem caused by unbalanced fuel, asymmetric wing-stall characteristics, or both. On this day, the previous pilot had reported that the port wing had dropped during his FCLPs. Edens climbed to a safe altitude to check the stall characteristics, which seemed normal. But on his first approach, the port wing dropped again and dragged along the runway while Edens applied power to go around. The aircraft climbed to about 3,000ft (915m), but then entered a spiralling descent to port from which it never recovered.

Even Kelly Johnson admitted that there was a problem. "Having a terrible time with stall and trim characteristics of the bird", he wrote in his diary. "We must rush the installation of retractable stall strips", he continued. These small devices

midway along the leading edge of the wing extended just half an inch when manually deployed by the pilot. But they improved the stall characteristics and gave pilots better warning of an incipient stall. The stall strips proved particularly valuable to U-2 pilots making a carrier approach, when they might well be flying a few knots closer to the stall, in order to reach the deck at the correct speed and attitude.

The pilots of Det G were fully requalified for carrier missions by going to sea in September 1965, and again in late February 1967, aboard the USS *Constellation* (CV-64). Three months later the CIA unit was alerted for its first operational deployment in 18 months. A U-2G was hurriedly prepared and a ferry-support team boarded a USAF Boeing KC-135. In the early hours of May 29, 1967, the pair took off from Edwards for Loring AFB in Maine. Once there the U-2 was refuelled on the ground from the KC-135 and the duo flew to the American air base at Upper Heyford, Oxfordshire, in the UK. The U-2 landed after dark and was quickly hangared to shield it from prying eyes.

The operation was initially codenamed *Scope Panic*. Since that moniker was apparently too close to the truth, it was subsequently changed to *Scope Safe*. The plan was to fly over the Middle East, where Israel and its neighbours were on the brink of war. By deploying the carrier-capable U-2G, Project HQ was keeping its options open. If necessary, the aircraft could be flown to and/or from a Sixth Fleet carrier in the Mediterranean. Of

course, a land base would be preferable, and Project HQ was apparently hoping that Britain would finally come through and allow the use of its sovereign base at Akrotiri on Cyprus.

There was even some thought that one of the RAF pilots might fly missions. Martin Bee was one of the Det G pilots standing by at Upper Heyford, along with Jim Barnes and Al Rand, as the next move was discussed at the highest levels in Washington DC and London. Meanwhile, two USAF Lockheed C-141 Starlifters arrived at Upper Heyford with support equipment, which included spare cameras. On May 31 Project HQ instructed Det G and deployment commander Col Miles Doyle to install the carrier hook. It looked like France was going to refuse permission for the U-2 to overfly, and the mission would have to be recovered on the *USS Saratoga* in the Med. The Navy was asked to transfer sufficient Douglas A-4 Skyhawks to the other nearby American carrier (*USS America* — CV-66) to provide deck space for the U-2.

Meanwhile, tension in the Middle East reached boiling point. American intelligence was short of information; the last *Corona* satellite mission had been in early May, and the next one could not be launched until mid-June. Of course, even a U-2 mission would not produce timely results, unless the “take” was quickly processed and interpreted. There was much discussion over where that could be done. The possible options were in the UK (by the RAF), in Germany (by USAF Europe) or back in the USA.

British Foreign Secretary George Brown went to inspect the U-2 at Upper Heyford. The British government approved a mission on June 2, to be flown by Sqn Ldr Bee. But Washington had second thoughts. On June 5 the Israeli Air Force

launched a devastating attack on Egyptian and Syrian airfields, and Israeli armour raced across the Sinai Desert. With the U-2 still hidden in the hangar, the support team waited — and waited. Project HQ sent a cable from Washington: “Many meetings under way here but nothing firm yet”.

The aircraft needed a shakedown flight. The British, however, began to get nervous about having such a notorious spyplane on their soil, and insisted that it be flown after dark. Word that the U-2 was at Upper Heyford leaked out. On June 7 the UK regretfully requested that the U-2 be withdrawn. The shakedown flight took place that night, and the U-2 was flown back to the USA two nights later. Israel won a decisive victory in the Six-Day War, unobserved by the U-2.

THE IMPROVED U-2R

In 1968 the enlarged and improved U-2R version entered service. These aircraft had *Kitty Hawk*-class carrier capability from the design stage, including a removable tailhook and spoilers. The wingspan was now 100ft (30.5m), so the outer 6ft (1.8m) of each wing was hinged so that the U-2R could still fit on to a carrier’s elevator.

The hook was fitted and tested during a two-day visit by Det G to the mock carrier deck at NAS Lakehurst, New Jersey, in early September 1969. The carrier-landing characteristics of the U-2R seemed to be much better than the U-2G, thanks to the new model’s option to set the flaps at 50°. Also, the latest version of the Pratt & Whitney J75 engine had a higher r.p.m., which allowed a faster response to wave-offs.

Four pilots from Det G were sent to NAS Pensacola for carrier-landing qualification on the US Navy’s T-2Bs. These were Ben Higgins and Dave Wright, recently recruited from the USAF,

A U-2R aboard the *USS America* during the November 1969 trials. In common with its U-2G predecessor, the U-2R could take off easily from a carrier without the aid of a catapult.





TOP & ABOVE More colour photographs from the November 1969 U-2R carrier qualification trials — note how the serial on the fin has been crudely censored in the lower image. Although the type had demonstrated its ability to operate from aircraft carriers with aplomb, resistance to its use at sea remained fierce among the US Navy brass.

plus Sqn Ldr Dick Cloke and Flt Lt Harry Drew, the two RAF pilots then assigned to the project. Their chaperone was Lt-Cdr Lonnie McClung, a rated US Navy pilot who had replaced John Huber as Det G's resident LSO. (Huber returned to regular Navy flying and was killed in the crash of a North American RA-5C Vigilante.) Lockheed test pilot Bill Park also took the Navy carrier qualification. All five pilots returned to North Base where they flew mirror landing practices in the U-2R. The team then migrated to the USA's East Coast, where the new carrier *USS America* (CV-66) had been made available during its shakedown trials. Two U-2Rs were ferried to Wallops Island, the NASA airfield in Virginia.

The assigned day of November 21, 1969, dawned clear, although the sea state was fairly rough. Park flew out to the carrier and began his first approach. He had decided upon an approach speed of 72kt with a wind-over-deck of 20kt. Like the earlier G-model pilots, Park had to rely on the airspeed needle as he had no angle-of-attack indicator in the cockpit. As Park neared the ship, he pulled the lever to lower the hook — and nothing happened. Someone had forgotten to remove the locking-pin before he took off. He returned to shore for a quick fix and was soon out at the boat again. He completed two traps, plus a lightweight and heavyweight take-off. In Park's opinion, the hook was hardly needed.

After the test pilot had proved the concept, the four Agency pilots each qualified by flying two wave-offs, four touch-and-goes and four traps. The aircraft was moved to and from the hangar deck, to prove that it would fit. The CIA's pilots were now certified ready to perform operational carrier-based missions in the new U-2.

Most of the Navy hierarchy, however, was still opposed to the U-2 taking up valuable deck space on its precious aircraft carriers. Some officers in naval aviation were interested in the U-2 as an ocean surveillance and data-relay platform operating high over a carrier group. So when Det G went to sea again in July 1970 — a quick re-qualification visit to the *USS Kitty Hawk* off San Diego — a delegation of top Navy brass flew out from Washington DC to observe.

THE END OF THE LINE

The ocean surveillance idea resurfaced later in the 1970s, but with the U-2 flying only from land bases. By then the CIA was no longer flying U-2s. Det G's new pilots were sent for carrier qualification in August 1971 and November 1973. In 1974 Det G was shut down and the Agency turned over its four remaining U-2Rs to the USAF. Those two flights over the French nuclear test site in 1964 were the only operational U-2 missions ever flown from an aircraft carrier.



ABOVE Sqn Ldr Ivor "Chunky" Webster AFC at the controls of a U-2 during one of the many missions he flew in the aircraft following his transfer to NASA in 1971. These missions included scientific research into atmospheric dynamics and oceanic processes.

And what of Chunky Webster, the British pilot whose ideas for landing the U-2 on an aircraft carrier had proved so valuable? The CIA asked him to stay on at Edwards after his RAF tour was over. Permission was apparently sought and obtained from London. Webster resigned his RAF commission in November 1964 and became an American citizen. He served as an instructor and test pilot with Det G for another six years. He provided the performance data and fuel curves for the improved U-2R model.

In 1971 Webster was one of the four veteran CIA U-2 pilots, led by Marty Knutson, who transferred to NASA along with the two surviving U-2G models. For the next 11 years Webster flew scientific research missions in those aircraft from the NASA Ames Research Center at Moffett Field, California. Ill-health ended his flying career in 1982. After retirement he continued to live at his home in the hills above the airfield, at Cupertino. He never married, and died alone in an accident at home in 1989.

This revised, updated and expanded article is adapted from 50 Years of The U-2 by Chris Pocock (Schiffer Publishing, 2005), available in the UK from Gazelle Book Services (www.gazellebookservices.co.uk)

ACKNOWLEDGMENTS

The Editor would like to thank Rachel Shelton of the Save the Ranger campaign for her invaluable help with this feature. To sign an online petition to help save the historic USS Ranger from the scrapyard and turn it into a museum, visit the campaign at <http://chn.ge/1a9Ry6Q>



Echoes from Dawn Skies

A Lost Manuscript Rediscovered

THE STORY SO FAR: Shortly before his death in 1956, aged 76, renowned pioneer pilot and flying instructor F.W. Merriam — who in 1912 was the first man to fly an aeroplane through cloud — completed a book manuscript, entitled *Echoes From Dawn Skies*. It comprised recollections of the early years of flying, gathered from his contemporaries — many of whom had by then become leading figures in the aviation world. Seeking “to present a more personal and intimate picture than has yet been produced”, Merriam had asked them each to “contribute a story of a personal nature, something that had never before been published”.

The result was a treasure-trove of fresh, first-hand insights into the lives, the work, the unquenchable spirit and the humour of these early flyers.

Sadly Merriam died before the book could be published, and the priceless manuscript vanished into obscurity for more than half a century . . . until, in the summer of 2013, it came to the attention of *The Aviation Historian*. Merriam's granddaughter, Sylvia Macintosh, aware of the manuscript's importance and keen to see it finally in print, discovered *TAH* and got in touch with Managing Editor Mick Oakey — who, having picked himself up off the floor, immediately set the wheels in motion. As Mick says, “Reading the material today is the next best thing to teleporting back in time and sharing a pint or a convivial dinner with these remarkable men”.

Merriam introduces his chapter on Eric Gordon England, published for the first time on the following pages, with these words: “If anyone deserves official recognition for all-round aeronautical work then surely it is Mr Gordon England FRAeS, FTLA, FTPE, FINI, whose ticket [Royal Aero Club pilot's licence] is No 68, but could have been gained considerably earlier, as one learns by his following interesting story” . . .

RIGHT *Eric Gordon England seated at the controls of a Bristol Boxkite at the same company's flying school at Larkhill on Salisbury Plain, where he was an instructor. Other notable early aviators here are, from left, standing: Lt Ercole; Lt Antonini; Señor Campana; Lt Moore RN; Lt Bower RN: Lt Atholl Wyness-Stuart; Pierre Prier and Henri Jullerot.*

Part Two of our exclusive serialisation of **FREDERICK WARREN MERRIAM's** unpublished volume of collected early-aviation memories, *Echoes from Dawn Skies*, features his chapter on Eric Gordon England. England started his career with Noel Pemberton Billing and José Weiss, and went on to perpetrate mischief in Germany just weeks before the start of World War One, as he recalls overleaf

PHOTOGRAPHS VIA PHILIP JARRETT UNLESS OTHERWISE STATED



"ALL VERY WICKED and IMPROPER..."

E.C. Gordon England FRAeS, 1891–1976



E.C. GORDON ENGLAND IMAGE ABOVE VIA F.W. MERRIAM ARCHIVE





ABOVE A portrait of Eric Gordon England during the second half of 1911, after he had joined the British & Colonial Aeroplane Co Ltd as a pilot and designer.

IT WAS WHILE I was serving my apprenticeship at the Great Northern Railway works at Doncaster during 1906–09 that I decided aviation was the coming thing; I was just under 18. Fired with determination I went home one weekend to Haywards Heath in Sussex to get my father's agreement to my being released from my previous apprenticeship and securing a job in aviation. My father was in bed with a bad attack of gout when I arrived home. It seemed not the best of times to start discussing what was then "just a crazy idea", but I tackled him. Very frequently since I have been lost in admiration for his forbearance.

Father listened to my enthusiastic pleas most kindly. Finally he gave his decision. "I'll agree to the course you wish to pursue on one condition", he said. "That is that you get a job in aviation and can keep yourself on the pay you get".

It happened that the first Aero Show at Olympia in London was on that weekend. So I went straight from my unfortunate parent's bedside to Olympia, and there I put the simple proposition to each aircraft constructor in turn. "I've a bet on with my father that I cannot get a job in aviation", I told them. "Will you help me win by giving me a job with sufficient pay for me to live on?" My fourth victim was the late Noel Pemberton Billing, and, having heard my story, he gave that quite inimitable laugh of his and said: "A young fellow with that spirit should get on anywhere. I herewith appoint you my aerodrome manager at the princely remuneration of 15 shillings a week".

So I returned to the parental home, tremendously elated, having been appointed aerodrome manager to Farnbridge aerodrome in Essex, which had a hangar. And a very noble hangar it was. In it were housed Howard Wright, José Weiss, Beny and the famous R.F. Macfie, and not forgetting "PB" himself. They were my tenants. It was their interests I was to manage.

The Weiss Syndicate

I rapidly endeared myself to José Weiss and his team because I was the only man who could induce their three-cylinder Anzani engine to run for a few minutes consecutively. Very shortly I was tempted to become chief engineer to the Weiss Syndicate, with, I might add, the utmost good grace on the part of PB, who was finding my princely remuneration a terrific strain on his pocket. That, then, was my start in aviation.

In those days the Weiss Syndicate was attempting to launch its machines into flight using a similar rail-and-derrick system to that of the Wright brothers. But the marshy land of the Farnbridge aerodrome was particularly troublesome. On several occasions the cable-



hook accidentally became detached from the aircraft, and the weight on the derrick disappeared into the bowels of the earth. Then we had to spend many a weary hour digging it out again.

After we had seen the Howard Wright machine and the Macfie monoplane find their several ways into the surrounding dykes, we decided Fambridge was neither large enough nor suitable for the Weiss machine. So we decamped to Amberley in Sussex, deciding we would undertake further experiments from the top of the Downs with a man-lifting glider of José Weiss's design. The glider was built in the local village hall and from there we took it to the top of Amberley Mount. Then I was chosen to pilot it, never ever having had any flying experience of any kind before.

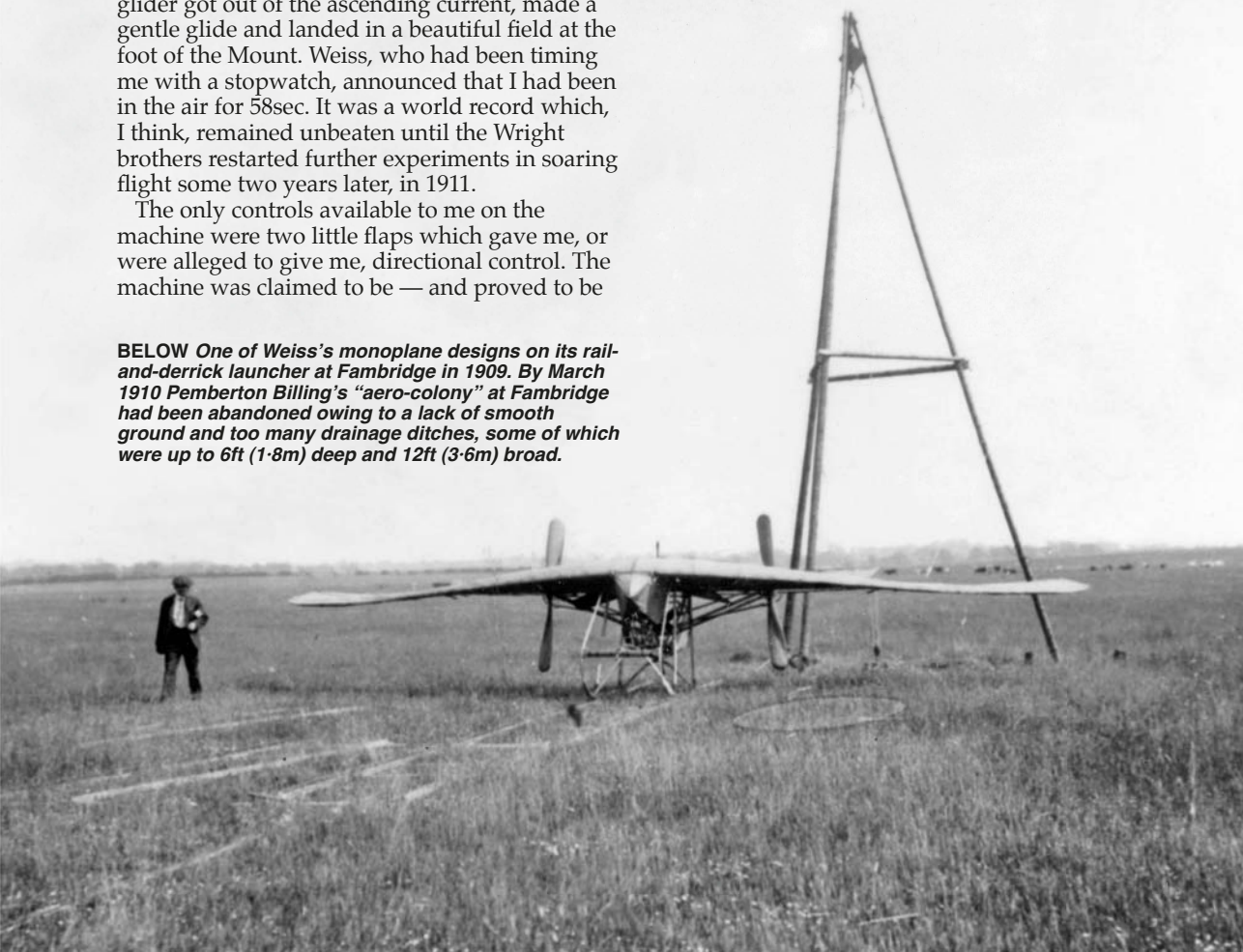
There was a nice stiff north wind blowing up the north side of the Downs, so it was decided to launch me over the very steep edge and see what happened. Weiss told me precisely what to do and then I was just pushed over the edge. The wind was strong enough to carry the machine about 100ft (30m) above the starting point. When going gently forward on the crest of the wind the glider got out of the ascending current, made a gentle glide and landed in a beautiful field at the foot of the Mount. Weiss, who had been timing me with a stopwatch, announced that I had been in the air for 58sec. It was a world record which, I think, remained unbeaten until the Wright brothers restarted further experiments in soaring flight some two years later, in 1911.

The only controls available to me on the machine were two little flaps which gave me, or were alleged to give me, directional control. The machine was claimed to be — and proved to be

BELOW One of Weiss's monoplane designs on its rail-and-derrick launcher at Fambridge in 1909. By March 1910 Pemberton Billing's "aero-colony" at Fambridge had been abandoned owing to a lack of smooth ground and too many drainage ditches, some of which were up to 6ft (1.8m) deep and 12ft (3.6m) broad.



ABOVE A rare photograph of José Weiss launching one of his glider models. A much underrated figure, Weiss was a strong advocate of the inherent stability of a birdlike crescent-shaped wing with reflexed tips and a variable camber from inner section to the wingtip.





**"I STRUGGLED OUT OF
THE SEWAGE FARM
GREETED BY ROARS
OF LAUGHTER — A
SORRY-LOOKING
SIGHT OF GREEN,
WET AND MUD . . ."**

LEFT A group of aviators from the *British & Colonial School* during a visit to *The George Hotel* in *Amesbury*, a short distance from *Salisbury* and *Larkhill*, in the spring of 1912. They are, in window from left to right: *Eric Gordon England*; possibly *Farnell Thurston*; *Henri Jullerot*; *Pierre Prier* and *Lt Moore RN*. In front of the window are *Lts Ercole and Antonini* of the *Italian Army*.

— inherently stable in all other directions. So elated were we with the first flight that after a few more shorter flights we decided to put an engine in the machine. Looking back, I can only say I think it was providential that the engine proved a failure and therefore we never ran any real risk of that machine taking off under power.

Into the sewage farm

Later we built another machine to take the old 35 h.p. eight-cylinder ENV engine that we had at Brooklands, and as soon as it was completed I took it out on the initial test. After running it about the ground for about 5min I decided to try a flight. The machine took off very well indeed, climbing rapidly, and I decided to do a few circuits at Brooklands. As I passed over the sewage farm the wing-stays collapsed and I was

deposited from about 60ft into the wettest part of the farm. The machine turned over as we struck, and pushed me underwater. But that again was providential, as it broke my fall and I was unhurt. I struggled out of the sewage farm greeted by roars of laughter — a sorry-looking sight of green, wet and mud.

Just previous to this "famous" flight I had bought, as bankrupt stock, an old Hanriot monoplane for £30. Getting up very early on a beautiful summer's day, I taught myself to fly. When the rest of the Brooklands band of pioneers came over at 0600hr they were astonished to find the old Hanriot monoplane was flying around, with me of all people on board. If I could have taken my pilot's certificate then, I should have been somewhere about No 3 or No 5 so far as British certificates went. The stipulations in those days, however, were three

Weiss built a series of powered monoplanes, which were named after his daughters. Madge, seen here with Weiss employee Gerald Leake at the controls at Farnbridge in 1909, was powered by an Anzani 12 h.p. three-cylinder fan-type radial engine connected via a chain-drive to a pair of pusher propellers.



Eric Gordon England in his ENV-engined Hanriot monoplane, which he affectionately named Henrietta. The aircraft's slender canoe-like fuselage was aerodynamically clean but offered its pilot little protection against the elements.



flights of 15min each, and dear old *Henrietta*, as we called her, never could keep up in the air for more than 10–12min. So it was not until months afterwards, when I joined the Bristol Aeroplane Co, that I was able to get my certificate, No 68.

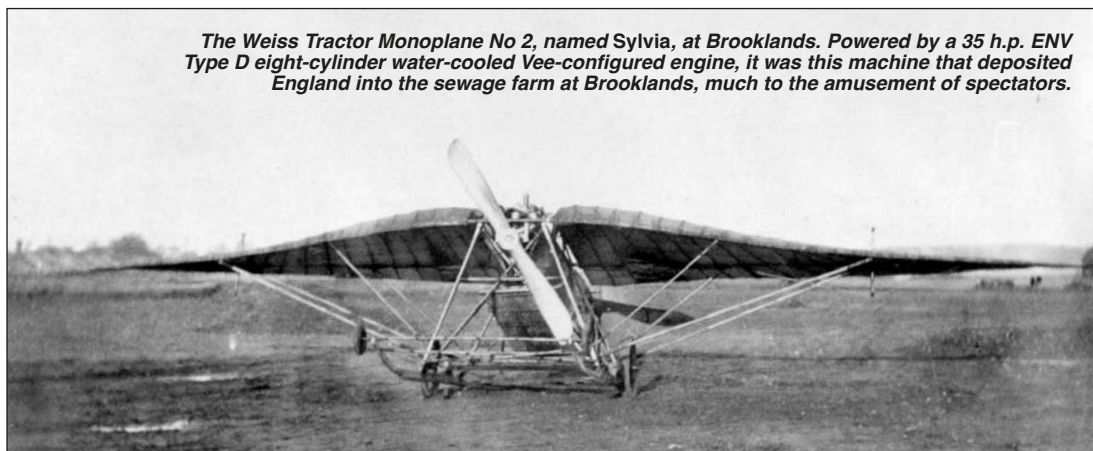
Referring back for a moment, José Weiss was, in my view, one of the greatest aviation pioneers. Practically all the principles he laid down were jeered at by the “knowing” in those days, but have in recent years been completely vindicated. Some of the designers of delta wings and whatnot would doubtless be immensely surprised to find that José Weiss had anticipated most of their ideas of form. He will ever remain in my memory as a grand character, a very lovable man, and I owe him an unpayable debt of gratitude for all he taught me, not only in aviation but in many other aspects. He was a great philosopher, a brilliant thinker and with all

a celebrated artist. In fact he kept the Weiss Syndicate going by painting pictures which were snapped up immediately, mostly by Americans who were very partial to his work.

It was not at all unusual for him to announce one day to us, his band of devoted workers, that he was going away for two or three weeks as he had run out money and he must go and paint pictures to re-establish his finances. And he never failed to do so.

I am always very pleased to be able to say his son, Bernard Talbot Weiss, who was a schoolboy when I first joined the late José Weiss, has remained one of my closest friends. Bernard became one of His Majesty's judges in Singapore. He and his wife were captured by the Japanese and reduced to living skeletons, in which condition I received them in my home after the Second World War. I shall remember with the

The Weiss Tractor Monoplane No 2, named Sylvia, at Brooklands. Powered by a 35 h.p. ENV Type D eight-cylinder water-cooled Vee-configured engine, it was this machine that deposited England into the sewage farm at Brooklands, much to the amusement of spectators.





LEFT England (nearest camera) and two colleagues pose with a Bristol Boxkite. **ABOVE** England later developed an abiding interest in motor-racing and in 1922 he and his father acquired an Austin Seven chassis, to which they added a light and streamlined body of their own design. This is one of England's many body designs. **INSET BELOW** England at Brooklands, where he worked as a staff pilot for British & Colonial.

greatest respect how completely unbroken their spirits were by the frightful ordeal through which they had passed.

A visit to Germany

Just one final episode. A month before the outbreak of the First World War I was commissioned by J. S. White & Co of Cowes, to deliver to the *Kaiserliche Marine* (German Naval Air Service) the very latest Wight seaplane — with, I might mention, the full approval of our Admiralty. My wife and I made a contract with the agent of the German Navy that we should have first-class travelling expenses, hotel accommodation and fees for every hour of flying I did on the occasion of my delivering the machine at Kiel.

The German agent tried to be a little cunning because he very much resented my insisting I would not go over to Germany and fly unless my wife went with me at his expense. So he put us up in a second-rate hotel in Kiel, which had a sign which read "English Spoken Here". I asked the manager and told him I really wanted his advice. Could he tell me which was the best hotel in Kiel? Why, certainly he could. For a young and active couple such as my wife and I there could be no better, gayer, place than the Hotel Continental. I thanked him, bought some little souvenir, which, incidentally, we put promptly on our bill for expenses, went straight to the Hotel Continental and asked for the manager. Owing to an error we had been put up at a second-rate hotel, I explained to him. He might expect us to return, complete with our luggage, within the hour.



We then went back for our kit, left a message for the German agent saying where he could find us, and installed ourselves in luxury at the Hotel Continental. A very hot and bothered German agent — who turned out to be no less than a German naval captain — soon appeared, protesting we had no right to go to such an expensive hotel and asking us what we were paying for our room. I advised him we had not got a room, but a suite, and we had not the vaguest idea what the price was, it being of no concern of ours as our contract was that we should have first-class hotel accommodation. When he started to be troublesome I read him a very severe lesson on deceit and he quickly gave up the unequal contest.

The Germans had no machine to approach the Wight seaplane and were frightfully excited when I gave the first demonstration flight from the naval air station at Kiel. A very sporting German officer [*Kapitän-leutnant* Schroeter] insisted on being my passenger on the acceptance flights. I then discovered that the Kaiser was going to open the Kiel Canal officially a few days later, and for this great event the whole of the British Atlantic Fleet was to visit Kiel harbour. So I entered into a conspiracy with Schroeter, that we would work things so that the acceptance flights would be timed to have us in the air at the time of the official opening. The plot succeeded. Schroeter, in broken English, told me he had instructions that the whole of the acceptance flight was to take place outside Kiel harbour, over the Baltic. The official instruction had gone out that no aeroplane was to be flying over the Kaiser's yacht or the battleships, all



dressed for the display, during the official opening. The only flight to take place at the time was to be made by a Zeppelin. All official aircraft were to be grounded.

Schroeter remarked: "Isn't it a pity that we will not be able to see the wonderful display of the Kaiser's yacht sailing forth through the lock gates of the Canal, at which instance the whole of the combined fleets are to fire a Royal Salute?" I remarked: "Isn't it a pity that I do not understand a word of German . . ." Whereupon Schroeter grinned mightily and slapped me on the back. We duly took off and headed out to the Baltic.

By chance, of course, I happened to know the exact hour of the opening. In good time I turned and headed for the entrance to the Kiel Canal. As we came near we saw that the Royal Yacht,

SMY Hohenzollern II — a most splendid vessel, gleaming white — was within a few feet of the lock gates. Then the prearranged pantomime commenced.

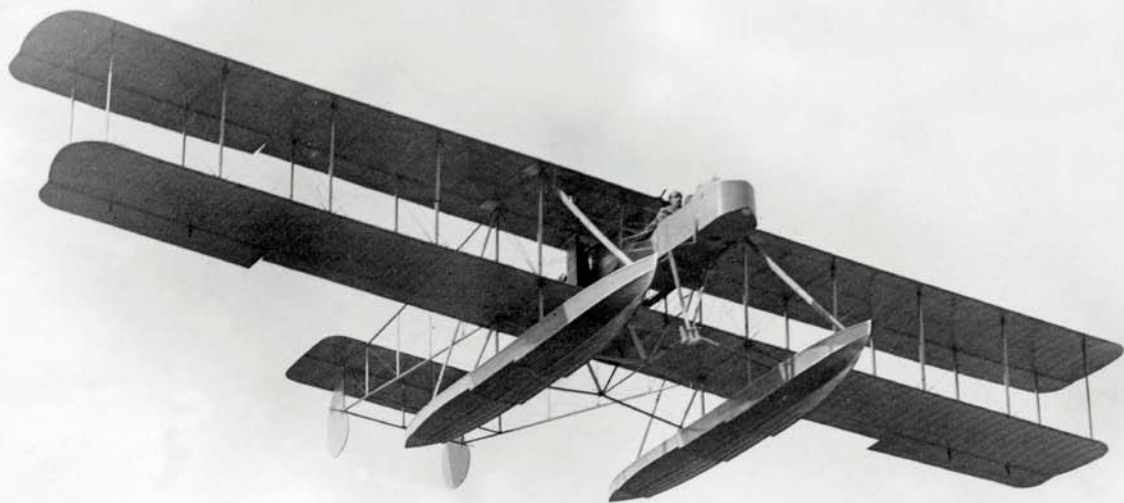
First over a Zeppelin

My gallant German companion, who was seated behind me, started to pat me on the back and gesticulate violently. I looked very puzzled and kept shaking my head, but otherwise paid no attention to his antics. This absurd performance went on until we were right over the Kaiser's yacht. At that instant the lock gates parted and the ship came out of the harbour. Then every battleship which lined the Kiel Harbour was surrounded by what appeared to be little bits of cotton-wool. It was a sight never to be forgotten.

Schroeter made some very weird signs and

TOP The prototype of the Wight 1914 Enlarged Navyplane, built by renowned shipbuilding company J. Samuel White, at the Olympia Aero Show in March 1914. **BELOW** A bigger version of the Wight Navyplane of 1913, which had three-bay wings, the five-bay 1914 Navyplane was powered by a 200 h.p. Salmson two-row liquid-cooled radial engine. The largest seaplane in the world at the time, the type was ordered by the British and German Admiralties.





ABOVE The 1914 Enlarged Navyplane in flight during trials at Cowes. Germany's first example of the type was launched on May 16, 1914, after which it was delivered by sea to Kiel. Sadly, England's partner-in-crime, Kapitän-leutnant Schroeter, was killed in the Enlarged Navyplane on June 25, 1914, the day after their "wicked" overflight.

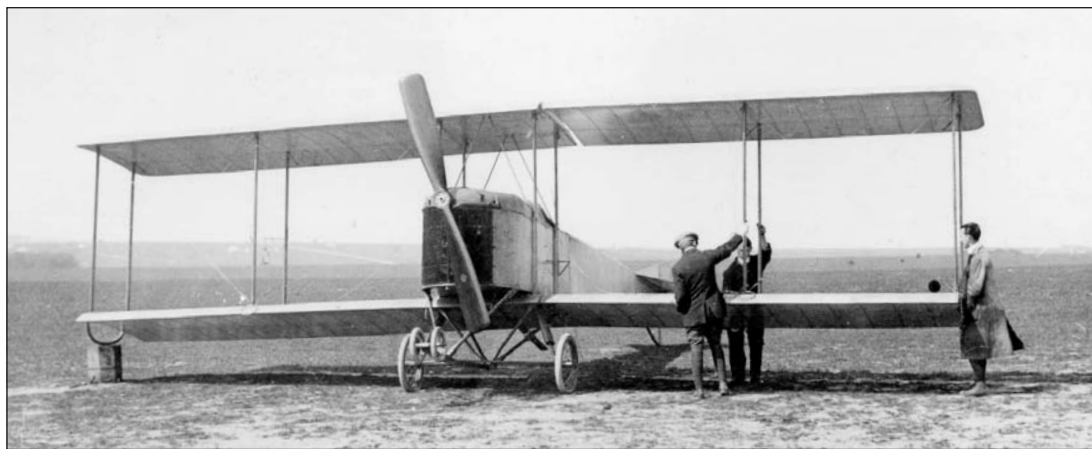
grimaces to me, and at that moment I spotted the Zeppelin coming over. On went full throttle, up went the nose of the machine and we climbed over the Zeppelin. So I became the first Englishman ever to fly over a Zeppelin. All very wicked and improper.

We completed the set duration of our flight and then I made one of the spectacular almost-on-to-the-slipway-landings for which, in those days, I had made myself famous on the Wight seaplane. As we moved up the slipway under power, our manoeuvre scattered the Commanding Officer of the air station, his brother officers, and all the ratings who were

waiting to see the inevitable fireworks.

The Commanding Officer came up to me as I got down from the machine. In first-class English he started to bellow, with immense solemnity, of the wickedness I had perpetrated. I *thought* there must have been something wrong, I explained, because Schroeter had made himself quite a nuisance during the flight. Now I realised what it was he had been trying to tell me. At the time, unfortunately, I had not been able to follow what he was saying, because of my lack of knowledge of the German language.

I had only Schroeter's word for it subsequently, but he told me he had explained to the CO that



ABOVE As well as being a talented airman, Eric Gordon England also showed promise as an aircraft designer. His first complete design was the G.E.1 biplane for Bristol, conceived as a robust two-seater with detachable wings to be transported with an army column. It was tested during May–June 1912, but had been scrapped by year's end.



ABOVE Eric Gordon England (left) with Mr G. Barbot at a gliding competition at Itford Hill in the 1920s. England died in February 1976 at the age of 84.

he had done his best to make me understand, but as his English vocabulary was extremely limited he had had to address me in German. Of course, what with the noise etc, he had failed to make me understand. My own impression was that the Commander of the station was far too good a sailor not to know what had really happened and decided to accept it all in good faith.

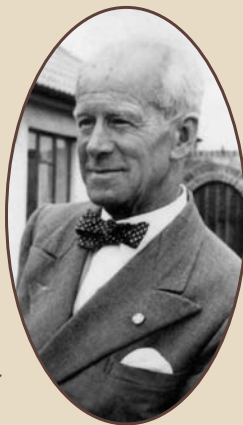
On the occasion of this famous visit to Kiel my wife was invited to visit the air station surreptitiously as, apparently, there was a rule that no women were allowed on the station. As luck would have it there was only one road on and off the station. We had no sooner got her there and were showing her around when our dear old friend the agent appeared. He had induced Prince Henry, the Kaiser's brother, to come and look at the Wight seaplane, he explained. Then he caught sight of my wife. He was furious. "You must hide her!", he said, "Prince Henry is already on the road here". With great presence of mind the Commander locked my wife in the cell for drunks. It was quite safe, he said, because his charge sheet was absolutely clear and Prince Henry would only want to see the cells if the sheet showed there was someone in trouble. So I think it is probably an historical fact that my wife is the only Englishwoman who has been locked up in a German Naval Air Station cell for drunks.

ACKNOWLEDGMENTS

The Aviation Historian would like to thank Sylvia Macintosh and Philip Jarrett for their invaluable help with this feature

Merriam's chapter postscript to Eric Gordon England's recollections:

"THOSE
WERE THE
DAYS ..."
CONCLUDES
GORDON
ENGLAND.
INDEED THEY
WERE ...



... even if we early flyers did make one or two unscheduled visits to the Brooklands sewage farm, and, worst of all, suffer much too often, the lamentable loss of a fellow flying colleague. Sadly, Gordon England's brother, Geoffrey (a pupil of mine), was one of these.

We sought solace and comfort in the kindnesses of Mrs Billing, who ran the Bluebird Restaurant at Brooklands before the Great War, and Mrs Bullen, who billeted so many of us early flyers. During the time I was boarding at the latter, an amusing incident occurred that I can scarcely ever forget.

Gordon England possessed a little Aberdeen terrier, who rejoiced in the name of Togo. He brought him back from his home one weekend and left him at Mrs Bullen's while he went over to the track. This put her in a state of some concern because she was unable to get on with her work as Togo stood fiercely on guard outside his master's bedroom door. Try how she would to entice him downstairs, he would not budge. However, a delectable meal of some kind eventually got him downstairs, but all the time he kept a sharp eye on her; the moment she tried to get upstairs he left his food and was upstairs before she could get there — once more fiercely on guard!

FREDERICK W. MERRIAM

NEXT TIME — the memoirs of Short Brothers test pilot John Lankester Parker, including trials of the company's Shamrock (BELOW), built as a contender for the first transatlantic crossing.



FROM THE **TAN** ARCHIVE

New Kid on the Block

In May 1967 British enthusiasts were delighted to find the latest bit of USAF kit on their doorstep, when a factory-fresh F-111A paid a visit to RAF Wethersfield

CONTROVERSY: A WORD that, in the early 1960s, came to be inextricably linked with the startlingly advanced General Dynamics F-111 and its spectacularly troubled procurement programme. Developed from the contentious TFX (Tactical Fighter Experimental) project set up in 1961 for a joint strike fighter for the USAF and US Navy, the first prototype F-111A made its maiden flight on December 21, 1964. Incorporating afterburning turbofan engines and, most notably, variable-geometry "swing-wings", the brawny state-of-the-art fighter-bomber looked as if it had leapt from the pages of a science-fiction comic when it was unveiled to the public.

When the 19th pre-production F-111A, 65-5701, roared into RAF Wethersfield on May 22, 1967, after a 3,100-mile (5,000km) non-stop non-refuelled flight from Loring AFB, Maine, enthusiasts and press alike made a beeline for the Essex airbase. The new machine was to spend a few days there, being demonstrated to RAF and MoD personnel, before taking part in the Paris Air Salon in June.

It was the first time the F-111 had visited Britain, and every effort was made to emphasise the new Cold Warrior's futuristic looks; it was rolled out from a hangar on May 25 looking factory-fresh in its pale-grey and white USAF colour scheme, and its most distinctive feature — the variable-geometry wings — were shown off in various configurations. Seeing this example of the very latest in American military hardware was indeed a rare treat for British spotters in 1967, but the F-111 would soon become an old friend: the USAF deployed a sizeable number to British bases, where the type served for more than two decades.



MAIN PICTURE On May 22, 1967, General Dynamics F-111A serial 65-5701 departed Loring AFB in Maine, in company with the 20th pre-production example, to make the controversial new strike fighter's first visit to Europe. In charge of the two-aircraft formation for the transatlantic hop — the other flew direct to Paris — was the USAF's Col Ray Roberts, who reported that the flight was made with full internal fuel at the optimum cruise sweep of 26°, at a cruise altitude of 29,000ft (8,840m). Here the F-111A is pulled from its hangar at Wethersfield on May 25, 1967.

Photographs by MIKE STROUD



RIGHT & OPPOSITE PAGE, BOTTOM Colonel Roberts explained that he made the landing at Wethersfield at a speed of 120kt, retaining the cruise sweep of 26°, after 5hr 55min, and that the aircraft still had fuel for 1½hr aboard after arriving at Wethersfield. Three days after its arrival at the Essex base, the immaculately-appointed F-111A was made available for its first inspection by British officials and the press. The distinctive “swing-wing” was demonstrated in swept, unswept, “clean” and “dirty” configurations.



THE CAPRONI Ca.114 IN PERUVIAN AVIATION CORPS SERVICE



WINGS OVER PERU

*Having lost out to Fiat in the competition to build Italy's next state-of-the-art fighter in 1933, Caproni was encouraged to recoup its development costs by offering its Ca.114 to a foreign customer. **AMARU TINCOPA** continues his series on aviation in Peru with a review of the brawny but attractive biplane's career with the Peruvian Aviation Corps*



THE FRANTIC rearming process started by the *Cuerpo de Aviación del Perú* (Peruvian Aviation Corps — CAP) following the ceasefire of May 23, 1933 — which put a temporary end to the hostilities between Peru and neighbouring Colombia — led to the arrival in Peru of one of the most obscure fighters ever to serve in any of the world's air forces.

The end of the 1933 Colombia–Peru War found CAP forces deployed in the Amazon in a desperate situation, with only seven attack aircraft — four Vought O2U-1E Corsair biplanes and three Douglas O-38Ps (the latter was covered by the author in the first part of *Wings Over Peru* in *TAH5*) — along with a single Curtiss Hawk II fighter on strength, while Colombia's *Aviación Militar* enjoyed vast numerical superiority with the arrival of at least 12 of the 30 Curtiss Hawk IIs purchased earlier that year from the USA. These unpalatable facts forced the CAP, through the *Comisión Técnica de Adquisiciones* (Technical Purchase Commission), to investigate the international market for high-performance fighters capable of outperforming the nimble Hawk II and therefore contest Colombian supremacy in the air over the Amazon rainforest.

MEANWHILE IN ITALY...

Italy's *Regia Aeronautica* (Italian Air Force) fighter competition of 1933 engendered a fierce race between designs offered by Aeroplani Caproni

SpA — the Ca.114 — and Fiat (the CR.32), both biplane designs of mixed construction. Although the Caproni biplane was found to be superior to the Fiat design in climb, manoeuvrability and ease of maintenance, and inferior to the Fiat design only in horizontal speed, the Italian *Ministero dell'Aeronautica* nevertheless declared the CR.32 as the winner, reportedly discarding the Caproni design owing to its use of a non-indigenous licence-built copy of the Bristol Mercury engine, the 540 h.p. nine-cylinder Alfa Romeo Mercurius.

The Italian government, however, in order to allow Caproni to recoup its Ca.114 development costs, cleared the type for export sales through the *Consortio Italiano di Esportazione Aeronautiche* — Italian Aviation Export Consortium. The bureau contacted the Peruvian *Ministerio de Marina y Aviación* (Navy and Aviation Ministry — MMA), and offered the CAP both the Ca.114 and Fiat CR.30 fighters. The Peruvians were quick to send an evaluation team to Italy in order to test both machines. The CR.30 was rejected owing to its comparatively high price and troublesome Fiat 12-cylinder engine. The Caproni, on the other hand, made a favourable impression on the evaluation team and the MMA issued an order for 12 machines and six sets of floats, which were to be delivered under specific terms, including a strict delivery schedule.

Caproni promptly complied with the requirements established by the Peruvians and by



Six of the 12 Caproni Ca.114s of the Cuerpo Aviación del Perú lined up outside the Fabrica Nacional de Aviones (National Aircraft Factory — FNA) at Lima after overhaul in May 1939. Italian influence in Peru was strong after the Peruvian government had invited an Italian Air Mission to modernise the nation's air arm in 1935.



Artwork by RICARDO IRAOLA © 2014

The Ca.114s arrived in Peru in a glossy black and dark red scheme with thin ivory lines. Peruvian national markings were applied on the upper and lower wing surfaces and the fin and rudder. Insignia used by 2 EC included a top hat and cane painted on the port side of the fuselage ahead of the cockpit, as seen here, or a pair of dice in the same location.

December 1934 the aircraft were ready for delivery. The 12 machines were loaded aboard a steamer, the *SS Mameli*, at Genoa and shipped to Callao, in Lima, arriving in early January 1935. The crated aircraft were then sent to Las Palmas air base where the airframes were assembled by Caproni technicians sent by the factory. As fears of a protracted conflict with Colombia had failed to materialise after the peace agreement signed in Rio de Janeiro on May 24, 1933, the consequent demilitarisation of the area made the deployment of the fighters to the Amazon River unnecessary. Consequently, the Ca.114 would never see service as a floatplane fighter, and the six sets of floats were stored at a CAP warehouse in Callao.

INTO SERVICE

The CAP assigned nine of the aircraft to the newly activated *Segundo Escuadrón de Caza* (2nd Fighter Squadron — 2 EC) to be based at Teniente Coronel Ruiz airbase in Chiclayo, by then under construction, home of the *Primer Escuadrón de Aviación* (First Aviation Squadron — 1 EA). The shapely

Italian biplanes received the CAP serials I/2-C-1A to I/2-C-9A, and the unit underwent intensive training at Las Palmas with the three remaining machines, which had been pressed into service with the *Escuela de Aviación Militar "Jorge Chavez"* (Military Aviation School — EAM) as advanced trainers, receiving the CAP serials E/I-C-4A, E/I-C-7A and E/I-C-11A.

On April 17, 1935, a four-aircraft detachment took off from Las Palmas bound for Teniente Coronel Ruiz, led by the unit's chief commander Ergasto Silva Guillén. After arriving in Chiclayo the detachment performed a number of familiarisation flights over the area until April 21, when it returned to Lima. On October 5, with building work at Teniente Coronel Ruiz completed, the CAP High Command ordered the deployment of the aerial units assigned to 1 EA to their home base, and consequently a formation of nine Caproni Ca.111 and nine Ca.114 fighters left Lima at 1015hr, arriving at Chiclayo four hours later.

The CAP's Ca.114 contingent sustained its first operational loss on September 4, 1937, when

BELOW Caproni's design to the specification for Italy's next-generation fighter was a robust single-seat biplane with single-bay staggered wings of equal span, powered by a geared, supercharged Bristol Mercury radial engine, or a licence-built version thereof. The aircraft showed great promise but was rejected in favour of Fiat's CR.32.



RIGHT An unidentified instructor poses in the cockpit of one of the three Ca.114s initially operated by the Escuela de Aviación Militar at Las Palmas. At the same time as the Italian Air Mission was invited to modernise Peru's air force, Caproni was awarded a ten-year monopoly on the construction and repair of all military aircraft in Peru.

BELOW Officers of the Coronel Francisco Bolognesi training class pose with Regia Aeronautica pilot Teniente Luigi Bianchi (front row, centre), who was one of a number of Italians posted to Peru in 1935 to train Peruvian fighter pilots.



HUMBERTO CURRARINO VIA AUTHOR

Alférez (2nd Lt) Enrique Fuller took off from Las Palmas in E/I-C-7A during a routine gunnery practice flight at Lurín training ground, south of Lima. After 15min flying time the aircraft's engine lost power, forcing Fuller to make an emergency landing in a nearby farm field. The aircraft ran into trees, sustaining 60 per cent damage to its airframe, rendering it unusable, and Fuller was seriously injured. The remains of the aircraft were later recovered by personnel from the Caproni Peruana factory, who stripped it of all reusable parts and kept it in storage until late 1940, when it was scrapped.

Another loss occurred on August 18, 1938, this time at Chiclayo, when Lt Carlos Frias crashed into a farm field in Caproni I/2-C-6A. The pilot was seriously injured and the aircraft was a complete write-off. Personnel from Teniente Coronel Ruiz recovered all the useful parts from the wreck before the Comandancia General de Aeronáutica (Air Force Headquarters — CGA) ordered the airframe to be sent to the scrapyard. In order to keep the unit's operations unaffected,

CGA ordered the transfer of one of the Ca.114s available at Las Palmas to Teniente Coronel Ruiz to serve as a replacement.

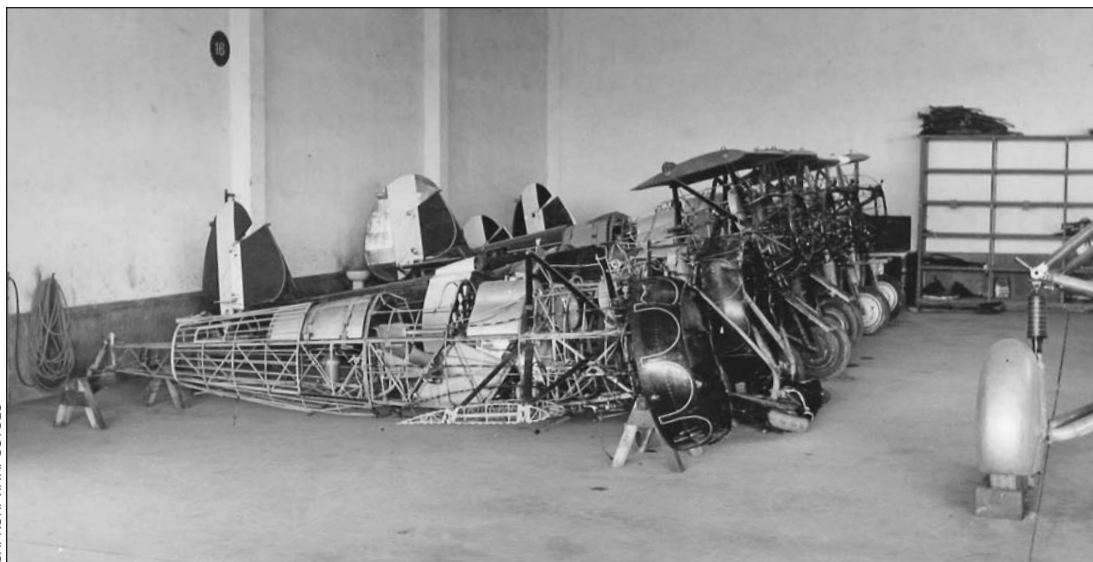
REORGANISATION

In June 1939 Ca.114s E/1-C-4A and E/1-C-11A from the EAM were sent to the Caproni Peruana (FNA) factory to be the first examples to receive major inspection and overhaul. This included minor modifications to the airframe, most notably the replacement of the heavy exhaust-collector ring with lighter individual exhaust stacks. Both aircraft left the factory sporting an overall aluminium paint finish. The following month the Ca.114s of 2 EC were also sent to the factory.

Organisational changes introduced by the MMA in June 1939 affected the composition of all CAP units; 2 EC was disbanded, being replaced by the newly activated XXI Escuadrón de Caza (XXI Fighter Squadron — XXI EC) which comprised three *Escadrilles*, Nos 41, 42 and 43, equipped with a complement of North American NA-50 and Ca.114 fighters. In the meantime, four



HUMBERTO CURRARINO VIA AUTHOR



ABOVE In the summer of 1939 the Ca.114s were sent to the FNA factory, run by Caproni Peruana — the Italian company's Peruvian subsidiary — for an extensive programme of inspection and overhaul. Here the airframes are seen in the FNA hangar at Lima substantially dismantled. They would be repainted in an aluminium finish.

remaining biplanes were assigned to the V *Escuadrón de Instrucción* (V Training Squadron — V EI) of the EAM, to serve as advanced trainers and replacement aircraft.

At the end of 1939, V EI received several wooden propellers from the Caproni factory for use with the Ca.114s. These were produced by special request of the CGA in order to preserve the stocks of metal propellers for these aircraft, the availability of which had become compromised owing to the war in Europe.

1940 passed without incident for the Ca.114 fleet, activities being mainly focused on combat training at Teniente Coronel Ruiz in Chiclayo, and conversion flights at Las Palmas. This situation changed during early 1941 with the creation of the *Teatro de Operaciones del Norte* (Northern Operations Theatre — TON) as a direct result of an increase in border tensions with neighbouring Ecuador. As part of the *Primer Agrupamiento Aéreo* (First Air Group — 1 AG), XXI

EC was included as part of the TON, and was tasked with the protection of Peruvian airspace over the country's north-western borders, often deploying *Escadrillas* 41 and 42 to forward airfields Tumbes and Talara respectively. The high number of sorties performed during this period led to a third Ca.114 incident. On June 26, 1941, XXI-43-3, flown by Alférez (2nd Lt) Rolando Gervasi hit the ground during low-level manoeuvres and was substantially damaged. Miraculously, Gervasi walked away with only minor injuries, returning to operations after a few weeks, while the aircraft was sent to the Caproni factory in Lima, where it was repaired.

IN ACTION

On July 5, 1941, tensions between Peru and Ecuador escalated into military action, and the XXI EC units were deployed to Peru's northern frontier to provide support for the Peruvian Army forces and other CAP units in the area.

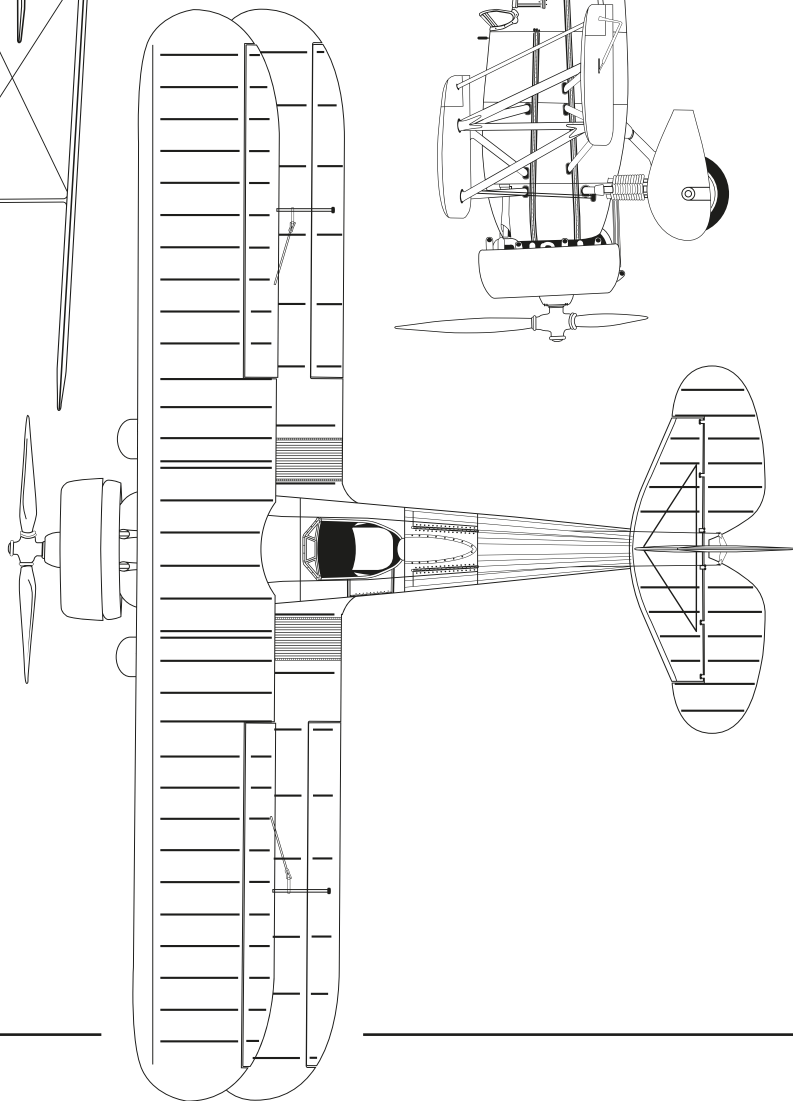
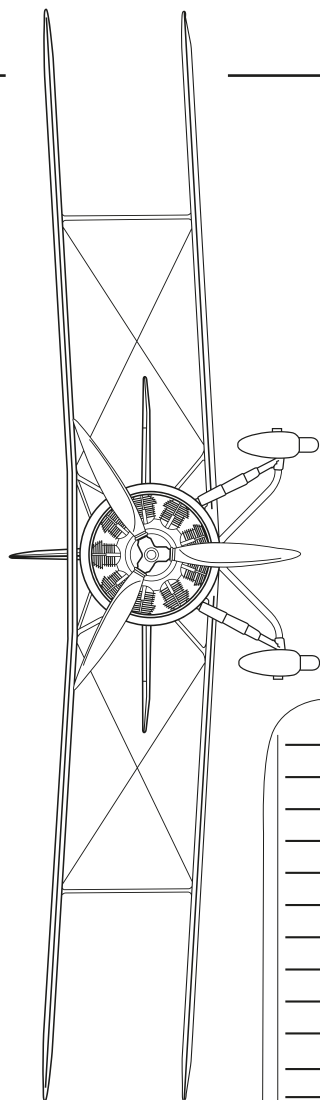
A line-up of Ca.114s at Teniente Coronel Ruiz air base in Chiclayo, on Peru's north-west coast, before their overhaul in 1939. A Vought O2U-1E Corsair and a Stearman C-3R may just be seen at the end of the line.

JOSÉ BEDOYA VIA AUTHOR

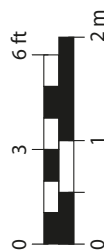
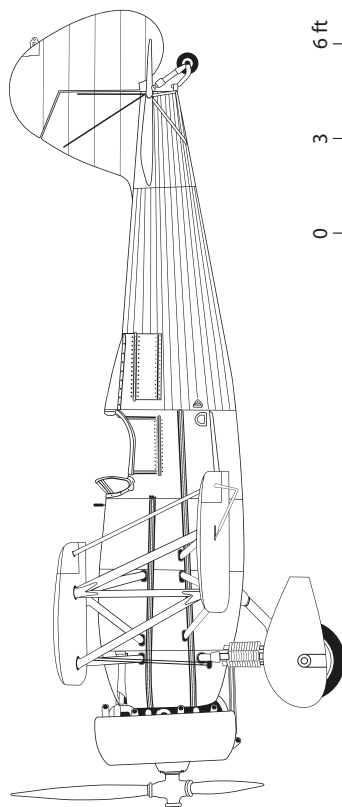


CAPRONI Ca.114

ARTWORK BY RICARDO IRAOLA © 2014



This specially-commissioned three-view artwork shows the Caproni Ca.114, as flown by the Cuerpo Aviación del Perú. The side-view shows the individual exhaust stacks which replaced the bulky original exhaust-collector ring (as on the plan view) on all Peruvian examples from 1939.



Seen here operating with 28 Escuadrón de Instrucción in early 1943, 28-4-6 was lost on May 14 the same year, when its pilot was "expelled" after his safety harness failed during a manoeuvre.



IEHAP VIA AUTHOR

Escadrille 42 was deployed to Tumbes forward airfield, located near the frontier, from where the unit's Ca.114s performed a number of missions, including escorting Fairey Fox IV floatplanes of 72 *Escuadrilla de Información Terrestre* (72 Land Information Squadron — 72 EIT), protection for Peruvian Army units stationed nearby and cover for the TON headquarters established at Tumbes.

Meanwhile, Escadrille 43 was deployed to Talara with orders to provide escort for the twin-engined Caproni Ca.310s of XI *Escuadrón de Bombardeo* (XI Bomber Squadron — XI EB) as well as to serve as reinforcements if required. To increase the operational strength of both Ca.114-equipped units, the CGA ordered the assignment of two additional aircraft to each of these units, thus raising their strength from three to five aircraft.

On July 23, 1941, Peruvian ground forces began a push into Ecuadorian territory, covered by CAP units. That morning *Capitán* David Roca and *Alférezes* (2nd Lts) José Winder and César Garcés took off from Tumbes in Ca.114s XXI-42-1, 42-2 and 42-4 to escort Fairey Foxes of 72 EIT. Having completed their escorting duties, the Ca.114s patrolled Ecuadorian territory looking for targets of opportunity and found a small Ecuadorian navy vessel, the *BAE Atahualpa*, near Puerto Bolívar. The boat was attacked with machine-gun fire, but damage was minimal.

A ceasefire was announced on July 31, which brought all offensive operations to an end, although Ecuadorian patrols over Peruvian strategic assets and the El Oro province territories — occupied by the Peruvian army — continued.



TORREZAN VIA AUTHOR

ABOVE Caproni technician Renato Torrezan, second from left, poses with his colleagues beside one of the recently overhauled Ca.114s at the FNA factory in May 1939. Without its distinctive undercarriage fairings, the Mercury-powered Ca.114 strongly resembles one of its closest British contemporaries, the Gloster Gauntlet.



Artwork by RICARDO IRAOLA © 2014

As border tensions between Peru and Ecuador increased during 1941, Escadrilles 42 and 43 of XXI Escuadrón de Caza at Tumbes and Talara were allocated more Ca.114s, which were divided between the two units. This example, 43-5, wears the XXI EC pennant and took part in numerous missions over the border during the hostilities of July–October 1941.

It was only on October 2, 1941, with the signing of the *Acta de Talara* agreement — which paved the way for the *Protocolo de Amistad y Límites de Rio de Janeiro* (Rio Protocol) signed between Peru and Ecuador on January 29, 1942 — that demilitarisation of the frontier began, and peace returned to the frontier. By this time the weary Caproni biplanes were ordered to return to Teniente Coronel Ruiz.

Most of the Ca.114s had reached the end of their useful lives, and, after an evaluation of their operational status, the newly-created *Ministerio de Aeronáutica* (Air Ministry — MA) issued an order that the four airframes in best condition be assigned to 28 *Escuadrón de Instrucción* (28 Training Squadron — 28 EI) of the EAM at Las Palmas, ordering the remainder to be scrapped.

SECOND-LINE SERVICE

The establishment of a Lend-Lease programme with the USA after the latter's entry into the war in December 1941 gave the CAP the wherewithal to acquire much-needed replacements for its obsolescent aircraft, including the Ca.114s. In May 1942 the first of a total of 28 surplus Curtiss Model 75A-8 Hawk monoplane fighters acquired by the Peruvian government began to arrive.

Meanwhile, at Las Palmas, the good handling and ruggedness of the Caproni biplanes were much appreciated by EAM students, although accidents and lack of spares for the Ca.114's engines began to take a toll on their numbers.

On October 15, 1941, Cadet Enrique Rivero Hard crashed into the sea near an area known as Lomo de Corvina in Ca.114 s/n 28-4-7. The strong currents off this part of the Peruvian coast made the recovery of the pilot's body somewhat difficult, but this was finally achieved three days later. On May 14, 1943, another Ca.114 was lost — this time without casualty — when Cadet Luis Costa Alfaro was “expelled” from 28-4-6 after his harness broke while he was performing a loop.

The pilot managed to open his Salvatore-type parachute immediately, and enjoyed a grandstand view of his aircraft smashing into an empty street in the San Isidro district while descending to earth. These losses left 28 EI with only two operational Ca.114s, both of which served until November 1944, when the lack of spare parts and wear-and-tear on the airframes forced the MA to withdraw them from service, ordering their scrapping shortly thereafter.

In July 1943 the US Air Attaché in Lima had witnessed mock-dogfights held between a Ca.114 and a Curtiss 35A Hawk II, reporting that the Italian fighter consistently managed to get into a firing position behind the nimble Hawk II, thus proving the superb manoeuvrability of the graceful Caproni fighter.



CAPRONI Ca.114 DATA

Powerplant 1 x 540 h.p. licence-built nine-cylinder single-row Bristol Mercury air-cooled radial engine (Alfa Romeo Mercurius)

Dimensions

Span	34ft 5in	(10.5m)
Length	25ft 2in	(7.68m)
Height	8ft 4in	(2.54m)
Wing area	276ft ²	(25.7m ²)

Weights

Empty	2,888lb	(1,310kg)
Maximum	3,660lb	(1,660kg)

Performance

Maximum speed		
at sea level	221 m.p.h.	(355km/h)
Climb rate	2,460ft/min	(750m/min)
Service ceiling	31,170ft	(9,500m)
Normal range	375 miles	(600km)

Armament

2 x fixed forward-firing 0.303in (7.7mm) Breda-SAFAT machine-guns

american classics

from the alpha archive

MOVIE STARS



In this latest selection of rare photographs from the Alpha Archive, a California-based privately-owned collection of images of American civil and military aircraft, we take a look at how Hollywood was quick to see the dramatic potential in aviation and turned the aeroplane into a star of the screen



ABOVE Hollywood goes to war — based on John Monk Saunders' story *Death in the Morning*, Paramount's 1933 film *The Eagle and the Hawk* highlighted the psychological stress the Great War had imposed on pilots. Starring Fredric March and Cary Grant, the film used flying scenes from some of the studio's earlier movies including *Dawn Patrol*, *Wings* and *Young Eagles*. The new footage was shot at the Paramount Ranch in Agoura, California, where a full-scale replica British airfield was built. Movie stunt pilot and aircraft supplier Garland Lincoln supplied four Nieuport 28s, five Thomas-Morse SC-4 Scouts, a Curtiss Jenny and a pair of de Havilland DH-4s for the film. Here, the British field comes under attack and airmen scramble past one of the DH-4s and a Nieuport 28.



LEFT & BELOW Wooden acting meets wooden aircraft. Flying Tigers (Republic, 1942) was John Wayne's first World War Two-themed movie and was — very loosely — based on the exploits of the American Volunteer Group in China. Most of the filming was shot at Thousand Oaks, California, studio carpenters having built a fleet of Curtiss P-40 replicas, some of which were powered by automobile engines for taxiing sequences. Because it was one of the first movies made in the wake of Pearl Harbor, it was well received by audiences, who wanted a positive message.



BELOW The Woman I Love (RKO, 1937) starred Paul Muni as a "lone wolf" French pilot who develops a reputation for returning from combat missions with dead gunners. The studio recreated a French airfield at Point Mugu, California, and the technical advisor was film flying legend Paul Mantz, who assembled a collection of Stearman C-3s and Curtiss Fledglings, which were painted in period French markings. Wally Timm modified some of the aircraft to appear as Hanriot biplanes (as used in the 1935 French version, L'Equipage).





ABOVE *Heroes of the front line* — as long as the front was near Hollywood. As the studios continued to make films with the first war in the air as a backdrop, attrition began to take its toll on the poorly-maintained original World War One-vintage aircraft frequently called into filming duty, and many were either wrecked or grounded owing to lack of airworthiness. When Hollywood sought replacements (if they were looking for the least bit of accuracy), the biplane of choice came from Travelair, based in Wichita, Kansas. Travelair aircraft indeed owed much to Germany's Great War veteran, the Fokker D VII; both had a welded-steel-tube fuselage and N-struts, and with a few minor modifications, the "Wichita Fokker" proved to be an effective stand-in for the real thing.



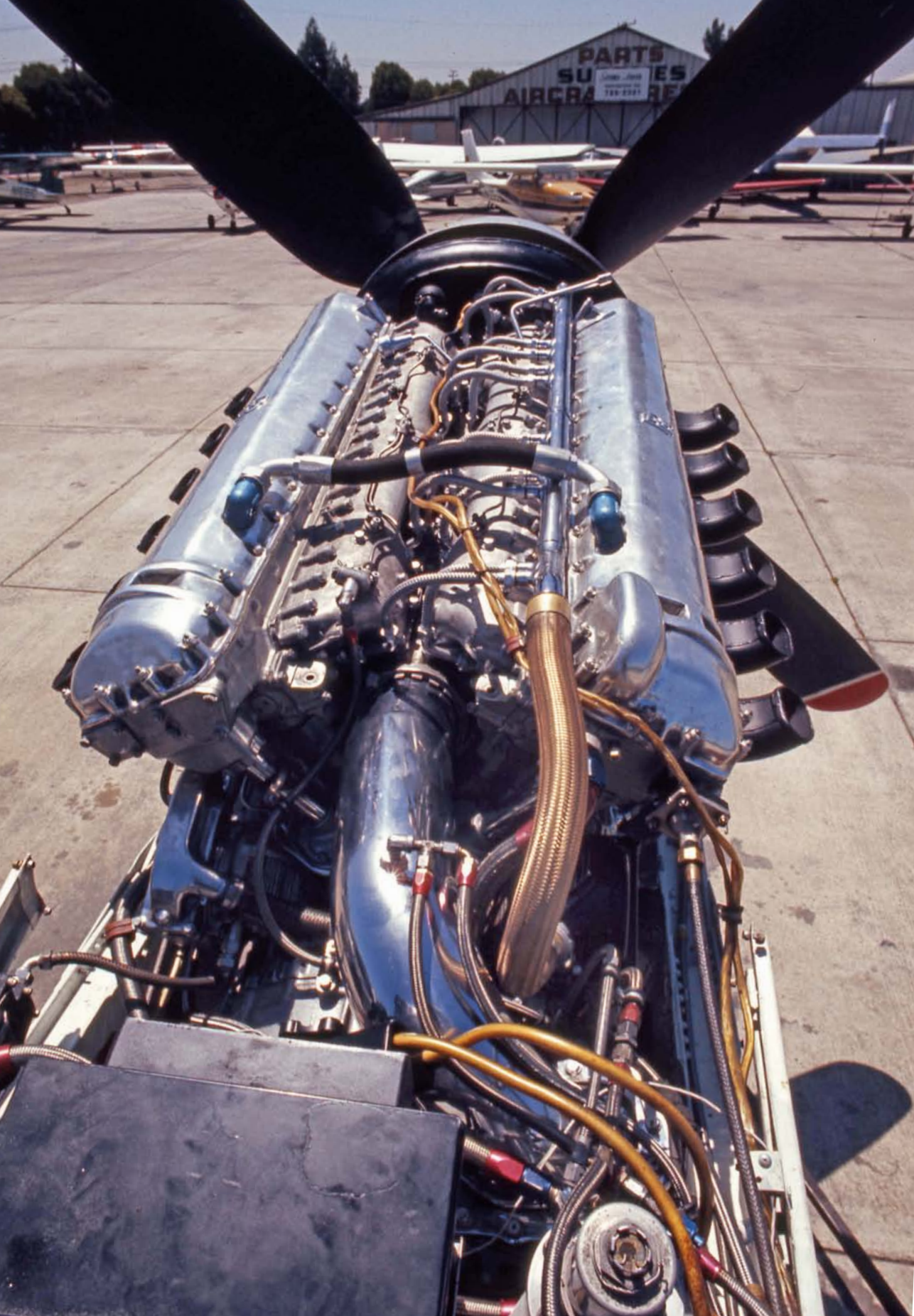
ABOVE A rather undignified moment from *Jet Attack* (American International Pictures, 1958), which starred John Agar, Audrey Totter and Gregory Wolcott. The movie was comprehensively savaged by critics on its release, the incoherent Korean War plot earning the film a spot in the book *The 50 Worst Films of All Time*. This stinker was made at Van Nuys Airport and used Air National Guard North American F-86A Sabres as Soviet MiG-15s. Soviet-style insignia were placed on the fuselage alongside 12in-high letters which read "California Air National Guard".



ABOVE One of the better-known aviation-themed films, Universal's *The Great Waldo Pepper* of 1975 covered the post-World War One life and times of a disillusioned US Army flying instructor turned barnstormer, played by Robert Redford. The still-impressive flying scenes were shot under the direction of another film flying legend, Frank Tallman. The film met with positive reviews, in no small part thanks to the flying sequences. This photograph was taken as Pepper — actually Tallman — flies a Standard J-1 biplane through a small Texas town to stir up interest in the “flying circus” visiting the area. Susan Sarandon played the part of a doomed wingwalker in the film and the dummy visible on the lower port wing portrays her during this challenging flying sequence.



ABOVE Ray Milland goes over the blueprints while Andy Devine checks out the mockup cockpit for the new “Falconer Bomber” in *Men With Wings* (Paramount, 1938). The storyline follows a family from the early days of flight to the beginning of World War Two. Directed by William Wellman (whose *Wings* won the first Oscar), this Technicolor film contains some excellent flying scenes under the direction of Paul Mantz. The part of the Falconer Bomber was played by a Boeing 247 for the flying scenes, one of which includes a squadron of Boeing P-12s.



IT'S QUICKER BY **TUBE**



During America's post-war air-racing boom, when surplus Rolls-Royce Merlin-powered P-51 Mustangs were relatively easy to come by, racing team boffins soon began experimenting with ideas to squeeze more speed from stock powerplants. Legendary air-racing pilot and engineer **BRUCE LOCKWOOD** explains how one of the most significant contributions to the development of the Merlin as a racing engine — the replacement of the aftercooler with an ingenious tube system — came from another community altogether

THE SECOND WORLD WAR brought about what could justifiably be called the golden age of supercharging. More advances were made in this field than at any other time in history. Although brilliant in design and a marvel of efficiency, Rolls-Royce's two-stage two-speed gear-driven supercharger still had its Achilles' Heel — heat.

Intended for use on its Merlin and Griffon series of aircraft engines, Rolls-Royce's novel approach consisted of pairing two impellers back-to-back, then separating each by a common intermediate casting. This compact design allowed each impeller to have its own efficient scroll and diffuser section. A common driveshaft received power through a gear train connected to the aft end of the crankshaft, thus rotating both impellers in unison. The entering "air charge" — compressed air containing fuel and ADI (anti-detonation injection comprising a 50/50 mix of water and methyl alcohol) — was initially compressed by the first-stage impeller before passing through the second stage for additional compression. Depending on the supercharger

MAIN PICTURE, LEFT This photograph of North American P-51 Mustang racer Roto-Finish with its engine cowling removed amply demonstrates how the "Tube Merlin" installation got its name. The shiny chrome tube that replaced the Merlin's aftercooler and its associated hardware is clearly visible at the aft end of the engine block. JIM LARSEN

PORTRAIT OF BRUCE LOCKWOOD: MICHAEL O'LEARY

drive-ratio selected, this combination could compress the incoming air charge by up to six times its original density. Unfortunately, this increase in density came at the expense of heat. The compressed air charge would typically exit the second stage on its way to the induction manifold at temperatures in excess of 175°C.

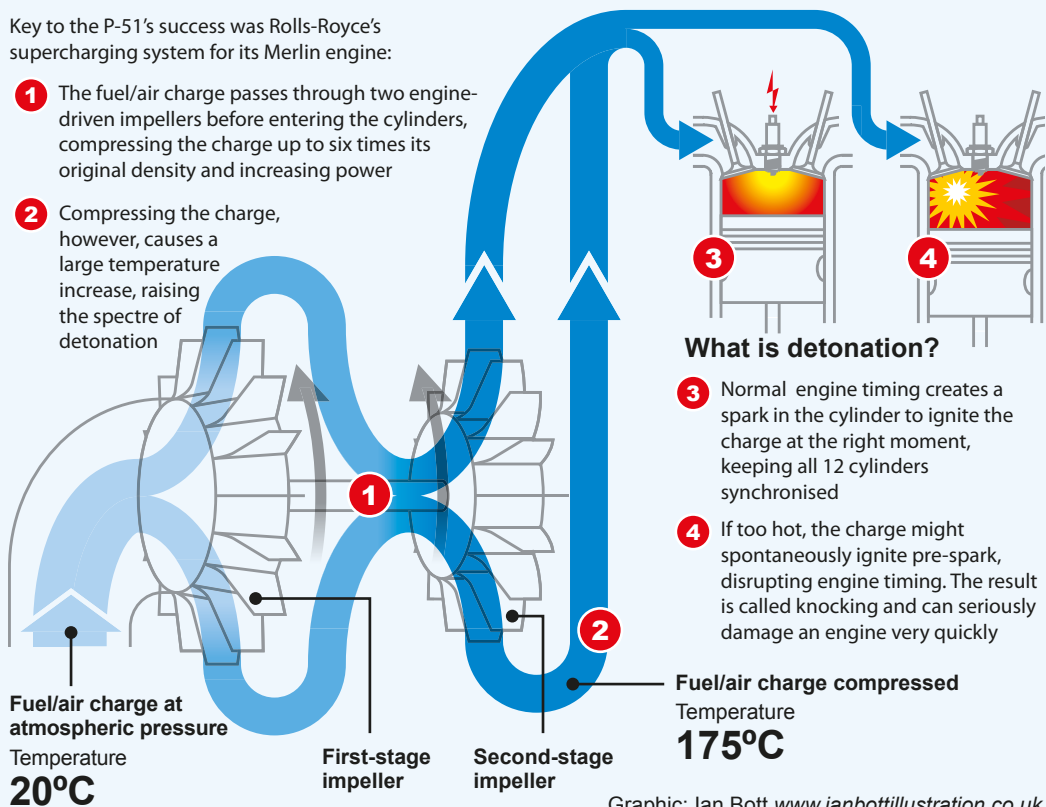
As a rule of thumb, internal combustion engines — whether supercharged or naturally aspirated — work better with the air charge entering the induction manifold at temperatures ranging between 65–100°C. When cooler than 65°C, the fuel vapour in the air charge tends to revert to droplets. These attach themselves to the interior of the induction manifold, adversely affecting both the mixture-ratio and combustion efficiency.

The P-51's supercharger and its Achilles' Heel

Key to the P-51's success was Rolls-Royce's supercharging system for its Merlin engine:

1 The fuel/air charge passes through two engine-driven impellers before entering the cylinders, compressing the charge up to six times its original density and increasing power

2 Compressing the charge, however, causes a large temperature increase, raising the spectre of detonation



Graphic: Ian Bott www.ianbottillustration.co.uk

Conversely, when the air charge is hotter than about 100°C, there is an ever-increasing risk of detonation and associated engine failure.

BEATING THE HEAT

To help combat the heat generated by compressing the air charge, Rolls-Royce designed and installed aftercoolers on all of its two-stage engines. The aftercooler typically appeared in the form of a cuboid hollow casting, approximately 18in (45cm) per side, located just aft of the cylinder-bank assembly. The lower section was attached to the exit of the second-stage supercharger by means of a rectangular bolted flange. The aftercooler exit — circular and about 6in (15cm) in diameter — was in turn connected to the induction manifold located in the V-section between the cylinder banks.

The interior of the aftercooler contained a sealed radiator core designed to allow the compressed air-charge leaving the second stage to pass

through a matrix of tubes on its way to the induction manifold. A separate engine-driven cooling pump circulated coolant at a rate of 35 US gal/min through the interior of these tubes. Heat drawn away from the air charge by the coolant subsequently reduced the charge's temperature by some 40 per cent. The heated coolant was then pumped through a system of pipes to a separate core of the main coolant radiator, which, in the case of the North American P-51 Mustang, was located in the type's distinctive scoop. Ram-air travelling through the scoop reduced the coolant's temperature, whereupon the cycle started again in a continuous loop.

Aero-engines had been used in the sport of hydroplane (boat) racing in the USA since Gar Wood and Chris Smith fitted a Curtiss V-4 powerplant in their boat *Miss Detroit III* in 1917, and the availability of surplus aircraft engines after World War Two presaged an upturn in their use in the sport. In the post-war world of Unlimited



hydroplane racing, two schools of thought developed as how best to cool the air charge of a highly supercharged Packard V-1650 Merlin. The most competitive crews soon discovered that the aftercooler system added additional complexity and reliability issues to the already fragile two-stage Merlin-powered hydroplanes and thus sought to alleviate the problem.

One hydroplane racer, Dixon Smith, seemed to have a better handle on this problem than most and soon developed his own ADI regulator. Simple in design, the ADI regulator was controlled by boost pressure in the induction manifold. As manifold-pressure increased, the regulator increased the flow of electric-pump-supplied ADI fluid. A supply line then carried the fluid from the regulator to its discharge point at the eye of the first-stage supercharger. Each regulator was calibrated for a specific boat and powerplant application, and could flow up to 200 per cent more fluid than was possible with stock military-surplus regulators.

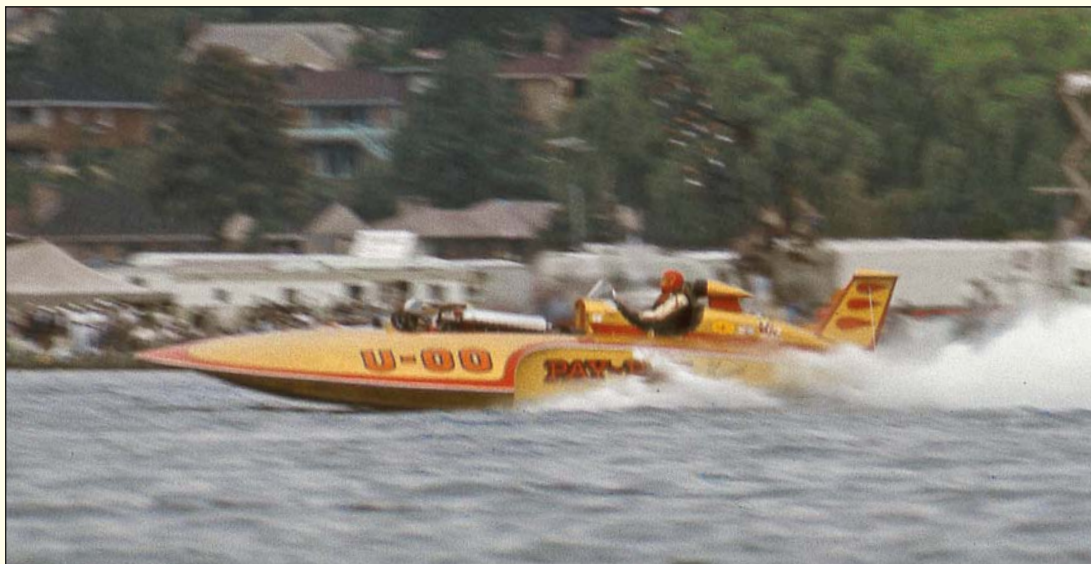
THE "AFTERCOOLERECTOMY"

Soon the majority of Unlimited boats had their aftercoolers and associated hardware removed. Installed in their stead was a shiny new handbuilt chrome induction "tube". With Smith's regulator installed the flow rate of ADI fluid at 49lb/in² manifold pressure (MP) increased from the original 1 US gal/min with the aftercooled engine, to more than 3.25 US gal/min for the modified tube-equipped engine at 69lb/in² MP. The ADI's latent heat of evaporation cooled the air charge in lieu of the aftercooler. The proportionate ratios of ADI injected to fuel used varied from crew to crew, but



ABOVE Dixon Smith, in red jacket, secures the bolts to one of the engine-valve covers on Pay 'n' Pak Lil Buzzard, one of the first Merlin-engined hydroplane racers to adopt the tube system. Behind the engine in white shirt and glasses is Dwight Thorn, the hydroplane engine specialist who first realised the potential of the tube system for use in air-racing.

BELOW Hydroplane U-00, Pay 'n' Pak Lil Buzzard, in action before it was involved in an accident in 1970 in which the driver, Tommy Fults, was killed.



JIM LARSEN x 2



ABOVE The “Swamp Buggy” — a school bus chassis modified for aero-engine testing— ground-runs the Merlin intended for the first of the tube-equipped Mustangs. Tests revealed that a stock aftercooler could provide sufficient cooling only up to about 45lb/in² MP, whereas the tube system allowed manifold pressures of up to 69lb/in².

generally was in the range of 0.5lb (225g) of ADI injected per 1lb (450g) of fuel consumed.

The benefits of this “aftercoolerectomy” were substantial and included a reduction in weight; increased reliability (aftercooler cores were prone to internal leakage) and an increase of manifold pressure of up to 2.5lb/in² (aftercooler cores imparted turbulence and an associated reduction of air charge flow through its core). Importantly, it greatly reduced the Merlin’s tendency to detonate at high boost by reducing the flame-front temperature in the combustion chamber.

The hydroplane racing teams brought drums of 115/145-octane Avgas with them or purchased

what was available at the racing venue. From there each team blended its own cocktails — sometimes with catastrophic results. The additional ADI-flow requirements of the “Tube Merlin” seemed to allow some leniency for any “brewing” errors and thus calmed the Merlin’s temperamental tendency to pitch all of its rods overboard during fits of detonation.

ENTER THE MYSTERY MAN

In 1966 noted hydroplane powerplant specialist Dwight Thorn — a friend of Smith’s and owner of a piston-engine restoration company subsequently known as Mystery Air Division —

The first Mustang to be fitted with a tube installation was P-51D N2869D in 1966. The aircraft had been raced as a stock machine as Bardahl Special/ Race 8 during 1964–65, but carried a new name, Challenger, and various airframe modifications for the 1966 season.



JIM LARSEN x 2

Solutions to overheating of the fuel/air charge: aftercooling and the Tube Merlin

How aftercooling works

1 A heat exchanger or aftercooler is installed on the engine between the impellers and cylinders

2 As the fuel/air charge passes through tubes in the aftercooler, cooling fluid absorbs its heat

3 The cooling fluid is pumped from the aftercooler to the radiator

4 Airflow through the radiator cools the fluid

5 The fluid is circulated back to the aftercooler where the process is repeated

However...

...the aftercooling system has its drawbacks. It is heavy, complex, aftercooler cores are prone to leakage and aftercooler-core turbulence leads to a reduction in manifold pressure

So, an alternative system may be installed: the Tube Merlin

6 The aftercooler system is removed and replaced with a system which injects ADI* into the eye of the first impeller

7 A regulator controlled by boost pressure in the induction manifold maintains ADI flow at the correct rate

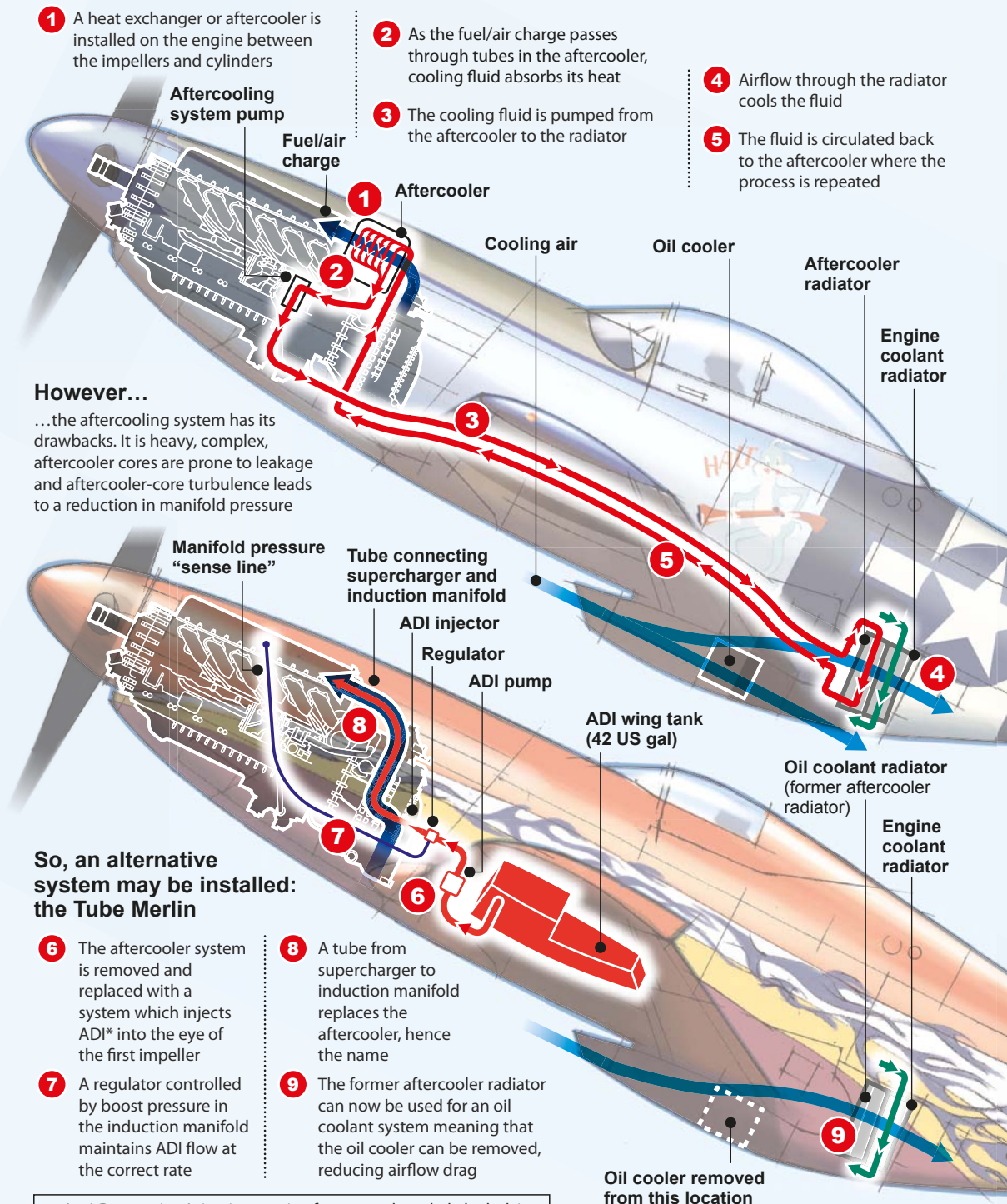
8 A tube from supercharger to induction manifold replaces the aftercooler, hence the name

9 The former aftercooler radiator can now be used for an oil coolant system meaning that the oil cooler can be removed, reducing airflow drag

* Anti-Detonation Injection, a mix of water and methyl alcohol; its latent heat of evaporation cools the air charge

Oil cooler removed from this location

Graphic: Ian Bott www.ianbottillustration.co.uk





LEFT The second Mustang to be fitted with the tube system was P-51D N7715C (serial 44-84961), named Miss R.J., and owned by Chuck Hall, chief pilot for Lockheed's L-1011 TriStar project, who is seen here with the modified Mustang during his 1967–71 ownership of the aircraft.

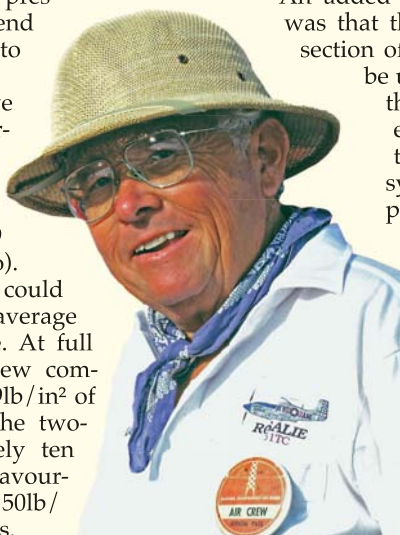
Packard

BELOW Dwight Thorn was an air-racing powerplant pioneer who refined the art of building high-performance engines for Unlimited-class Mustangs. Thorn began his air-racing career in 1964 as crew chief for Chuck Lyford's modified P-51 Bardahl Special, and went on to be responsible for most of the Merlins that have powered the world's fastest Mustangs, including Roto-Finish and Dago Red. He died peacefully at home in 2008.

decided to adapt this new tube-style engine for air racing. The first airframe to adopt the tube-style engine was P-51D Mustang N2869D (originally 44-84390), flown by Chuck Lyford and known as *Challenger*, with race number "8".

Heated discussions ensued about the fact that dumping such a large quantity of ADI fluid into the induction system of the tube engine would in effect reduce shaft horsepower. One of the benefits of injecting large quantities of ADI fluid was its ability to reduce flame-front temperatures. This reduction in flame-front temperature had the effect of also reducing combustion-chamber pressure: less heat = less pressure = less horsepower. The end result would be less horsepower to turn the propeller.

Dwight's solution was to remove the low-altitude V-1650-7 supercharger gearing (5.8:1 ratio) that most hydroplane teams were then running and replace them with high-altitude V-1650-9 supercharger gearing (6.39:1 ratio). Now he had an engine that could operate effectively at Reno's average 7,000ft (2,130m) density altitude. At full throttle and 3,400 r.p.m. this new combination could produce some 69lb/in² of manifold pressure by turning the two-stage supercharger approximately ten per cent faster. This compared favourably with the V-1650-7 limits of 50lb/in² MP under the same conditions.

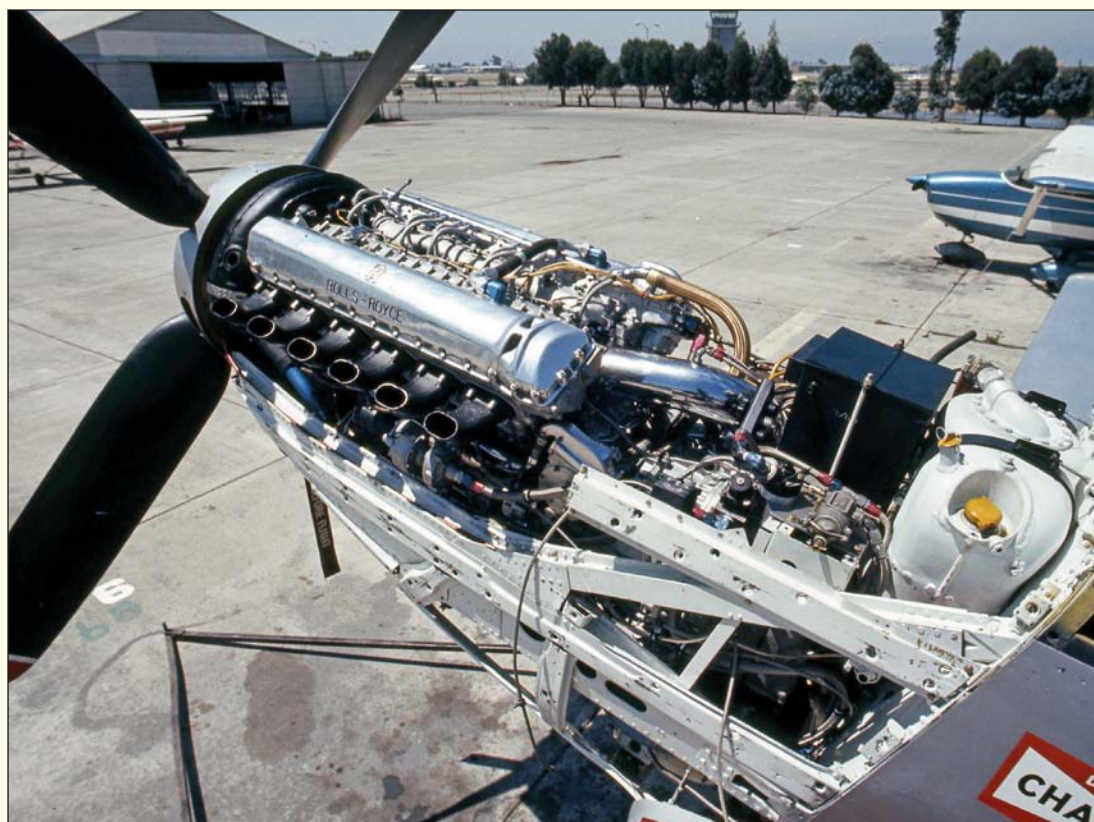


Relying once more on proven Unlimited hydroplane racing-engine modifications, the Merlin was substantially strengthened with the addition of G-model Allison connecting rods, different pistons, custom-made rod bearings — the Merlin and Allison have different oiling passages, bearings, and load designs — additional oil pumps, supercharger drive-train strengthening and large stiffening girders along the backbone and sides of the engine's crankcase. All told, literally hundreds of small refinements, modifications and tweaks have been applied in order to cope with the 3,800 h.p. this engine can reliably produce.

An added benefit of the "coolerectomy" was that the once-dedicated aftercooling section of the main radiator could now be used to cool the engine oil with the addition of an oil heat-exchanger located in the area of the now-absent aftercooler. This system used the aftercooler's pump and plumbing to cool the engine oil, much the same as used on the later more advanced lightweight P-51H. By doing this, the P-51D's oil cooler could be removed from the bottom of the cooling scoop, thus reducing its overall profile and drag. It was soon discovered that in removing the aftercooler, the reduction of weight bear-



ABOVE Following its stint with Chuck Hall as Miss R.J., N7715C was acquired in 1971 by Gunther Balz, who repainted the aircraft and named it Roto-Finish after its chief sponsor. The following year it finished first in the Unlimited Championship race at 416 m.p.h. (670km/h), before being sold on to a new owner, John Sliker, in 1973.



ABOVE Another view of the tube system installed in Roto-Finish. In February 1974 it went to a new owner, Ed Browning, who renamed the aircraft The Red Baron and had it fitted with a Rolls-Royce Griffon engine and contra-rotating props, the first P-51 to be so equipped. It suffered engine failure and crashed at Reno in September 1979.

First fitted with a tube system in 1996, Mustang N5410V (serial 44-74996), Dago Red, was flown by the author into first place at Reno in 1998, the aircraft going on to win Reno Gold for the next four championships. Dago Red also broke through the 500 m.p.h. (805km/h) barrier, when Skip Holm, seen here at the controls in 2003, posted a blistering 507 m.p.h (815km/h) at that year's championships.

MICHAEL O'LEARY





ABOVE Tiger Destefani's highly modified multi-Gold-winning Strega continues to fly the flag for the tube-equipped Merlin-powered racing Mustangs. Here, pilot Matt Jackson, who describes Strega as "the ultimate Mustang", shows the machine's clean lines during a photographic sortie at the 2013 Reno Unlimited Championships.

ing on the accessory-case casting, containing the highly stressed accessory/planetary drive section, could now survive more than one race.

TUBE OR NOT TUBE . . .

It is still a matter of lively discussion as to which engine combination can produce more horsepower: the tube-equipped or aftercooled engine. In this writer's opinion, given identical set-ups for the engine — same cams, pistons, supercharger ratios, ignition timing, boost and r.p.m. etc — the aftercooled engine is easier to operate from a piloting standpoint. There are no twiddle-valves to fine tune or wild induction-temp fluctuations during high r.p.m./low boost, as happens while flying formation down the start chute of a race. You can just push the throttle and go. I also feel that if you put both engines on the dynamometer, the aftercooled engine would make more horsepower — remember the point above regarding combustion temperature.

Now for the *really* interesting part. Having raced and tested behind both of these engine configurations I can firmly state that, without a doubt, the tube engine is substantially faster. Why, you ask, since I just said it has less horsepower? In simple terms, the top speed an aircraft can reach is the result of total thrust generated by the powerplant minus drag such as cooling, airframe/wing, and parasite-drag. Thrust is the factor of shaft horsepower multiplied by propeller efficiency, plus the effect of exhaust-generated thrust. What the tube engine loses in shaft horsepower it more than makes up for in increased exhaust thrust.

For comparison, a stock Merlin at 30lb/in² MP produces 300lb (135kg) of exhaust thrust and a V-1650-7-gearred aftercooled example produces 500–600lb (225–272kg) of thrust at race power. It is estimated that the tube engine generates more than 1,000lb (453kg) of exhaust thrust. With 300 per cent more ADI fluid being injected, there is a quantum increase in exhaust-gas density owing to increased water vapour in the exhaust gas.

Also to be factored in is the vast expansion of water, its volume increasing some 1,600-fold as it turns to steam. In theory the exhaust-thrust increase could be due to one, some or none of these factors — it could just be magic! I don't have the answer, but I firmly believe it resides somewhere in the great mind of Pete Law, a true legend in the field of air-racing thermodynamics. Throughout the era of modern air-racing, Pete's knowledge has done much to advance the sport, while his mentoring of Unlimited pilots is highly appreciated.

Ultimately the records speak for themselves; every Merlin-powered Gold Race win since *Stiletto's* victory in 1984 has been powered by a tube-configured engine. It is the king of speed; a thundering voice echoing off the surrounding Reno mountains as it powers its Unlimited P-51 to more than 500 m.p.h. (805km/h) around the pylons.

Unfortunately only a handful of these mighty engines still exist and fewer still are the men that can build and tune them. With Reno 2013 now in the past and with more restrictions being penned into the rulebooks, I fear that we may not hear the banshee cry of these magnificent pieces of machinery for much longer.



Although the Hawker Siddeley HS.801 owed much of its general appearance to the de Havilland Comet, from which it had been developed, it was in fact an entirely new aircraft and represented the cutting edge in anti-submarine warfare. Indeed, it was the world's first land-based four-jet maritime-reconnaissance aircraft to enter service. Seen here is the first production example, XV226.

ALL PHOTOGRAPHS TAH ARCHIVE



*what's in a **name**?*

NAMING THE HS.801: FROM COASTAL COMET TO NIMROD

In February 1965 it was announced that the Avro Shackleton would be replaced by Hawker Siddeley's HS.801. The type would almost certainly continue the great British explorer theme — or would it? **CHRIS GIBSON** reveals how protracted discussions led to some 40 names being considered before a suitable — and ultimately obvious — candidate was found



THE SEARCH FOR an Avro Shackleton replacement for the RAF ended on February 2, 1965, when British Prime Minister Harold Wilson announced that the service would acquire the Hawker Siddeley HS.801 to fill Air Staff Requirement (ASR) 381, an interim requirement for a maritime patrol aircraft. It had been referred to by various names, including Maritime Comet, Comet MR, Coastal Comet and, of course, HS.801. We now know this aircraft as Nimrod, an obvious name for a mighty hunter, but apparently not to the people involved in the naming process. Documents at The National Archives at Kew show that there was a lively debate on the name, with the only things missing being a bookmaker's odds.

MARITIME COMET? CORMORANT?

On March 19, 1965, the Director of Operations (Maritime, Navigation and ATC), Air Commodore R.H.C. Burwell, wrote to the three Assistant Chiefs of the Air Staff (ACAS) on the subject of naming the HS.801. The Air Commodore had pointed out that "Maritime Comet" was being used increasingly for the Shackleton MR.2 replacement. He considered the expression "cumbersome and confusing" and suggested the name "Plymouth" be adopted. Since at that time the formal contracts on the Maritime Comet had yet to be signed, it was highly unusual to apply a Service name to an aircraft so early in its procurement.

This came to the attention of Mr B.A. Rawet at the Ministry of Aviation (MoA), who suggested that, to prevent the name Maritime Comet becoming the service name by default, "it is perhaps opportune to select a suitable name". Rawet outlined the "rules" for naming RAF aircraft, reconnaissance aircraft being named after "British historical names, and flying-boats (which have largely performed maritime-reconnaissance duties)

after coastal towns and seaports of the British Commonwealth". Rawet promptly ignored all that and suggested "Osprey" and "Cormorant". This loose minute from Mr Rawet initiated one of the most fascinating and heated exchanges of paperwork in the post-war maritime-patrol story. For a start, one recipient of the minute, DD (Operational Requirements — ORs), has scribbled a note on it with an asterisk next to Cormorant, the note reading: "I would have thought not. Any brain waves?".

First out of the traps was Air Vice-Marshal Reginald Emson, ACAS (OR), who agreed that the use of the name Comet might be confusing and so advised that the aircraft should be referred to by its manufacturer's designation, HS.801. Emson, obviously unable to resist temptation, put in his suggestions and had a dig at Rawet at the same time. Possibly mindful of the then-recent events surrounding the BAC TSR.2, Hawker P.1154 and Royal Navy (RN), Emson stated: "I am not sure whether you had tongue-in-cheek when proposing Plymouth, which suggests to me either a gin and/or naval connection". Emson continued, suggesting that an "outstanding personality" from the RAF might be apt and suggests "Slessor, a former C-in-C of Coastal Command, or Trenchard, though the latter perhaps ought to be reserved for a supersonic aircraft". Here, Emson alludes to "Boom" Trenchard's nickname from his time at the Central Flying School.

OSPREY? ALBATROSS?

By the end of April 1965 Air Marshal Sir John Davis, the Air Member for Supply & Organisation (AMSO), and thus the officer responsible for procurement, had become involved and his Permanent Secretary, Mr A.G. Rucker, delivered a dismissal of Osprey by pointing out that it was a

Two prototypes of the HS.801 were built, using the last two Comet 4C airframes, which were fitted with Rolls-Royce Avon turbojets. One, XV148, seen here, was re-engined with the same company's Spey turbofans, while the other, XV147, retained its Avons.





The most distinctive difference between the HS.801 and its Comet forebear was the addition of a "double bubble" fuselage, the lower section housing the ventral weapons bay. The tail section was also significantly different, with a substantial dorsal fin and a fin-mounted radome. This is XV230, the first Nimrod to be delivered to the RAF.

name given to a Hawker Hart variant in service with the Fleet Air Arm whose service was "not understood to have been so meritorious as to call for revival of the name, quite apart from the fact that the real osprey habitually folds its wings and dives headlong into the water". Rucker goes on to say that the cormorant is also a diving bird before stating that the AMSO "favours the name 'Albatross', which is a graceful bird distinguished by its ability to undertake long flights over the sea; it is of course traditionally unlucky to shoot an Albatross". The AMSO also suggested "Drake", because it combined the name of a bird with the "Elizabethan sea-dog".

Air Vice-Marshal Denis Smallwood, ACAS (Ops), questioned the need for a new name as Comet was fine, but favoured Albatross rather than Drake as the latter was the name of "the Royal Navy barracks in Devonport". The Deputy Chief of the Air Staff (DCAS), Air Marshal Sir Christopher Hartley, favoured the names of gods such as were already in use for the Avro Vulcan and Thor ballistic missile, and so suggested "Venus", which has maritime associations, or "Apollo". He also admitted to liking Albatross, but pointed out that this was the name for the Grumman amphibian in service with the Royal Norwegian Air Force.

CABOT? CHURCHILL?

By May 4, 1965, Wg Cdr G.G. Beaugeard had taken on the collection of names, of which there were 16, Beaugeard favouring Albatross, the last on the list being "Dolphin". Three days later Beaugeard had a further seven names, courtesy of a colleague, including "Cabot", in honour of the explorer Sebastian Cabot in a continuation of the Shackleton theme, and "Churchill". By March 24, 1966, the intermittent debate was still under way and Wg Cdr Loveland pointed out that the British Army had used Churchill for a tank, but that "Winston" was a possibility, as was "Woodford", as it was Churchill's parliamentary constituency

and where the aircraft were being built. The next day, after a year of suggestions and no real progress on the name, Air Marshal Paul Holder, Air Officer Commanding-in-Chief, Coastal Command, became involved with naming the HS.801, which by this time was being referred to as the "Coastal Comet". Holder felt that the time was right to give the HS.801 a name, and that it should "have a direct connection with the role of the aircraft or be traditional", but that all the more attractive names had been used for RN ships or shore establishments. Holder observed that there was one, "namely 'Nimrod', meaning any great hunter, which has not been used", and that this was the name that Coastal Command preferred, with Trenchard as an alternative. Holder emphasised that "Nimrod would be a more suitable choice because it reflects the role of the aircraft, is short, easy to spell, unlikely to be confused and is not at present in use for any other ship, aircraft or weapons system".

SCOTT? SCORPION?

A couple of weeks later the ACAS (OR), Air Vice-Marshal Derek Hodgkinson, put his thoughts on paper. Hodgkinson was set against any mention of Comet as it would "give the impression that this aircraft would seem to be old before it came into service, than if it were given a new name now". He also pointed out that while he liked the name Nimrod, it had been "used for the carrier version of the Hawker Fury before the war".

Air Vice-Marshal Albert Case, Chief of Staff HQ Coastal Command, was set against any mention of Comet because "unfortunately, the press and others insist on referring to the 'Maritime Comet' rather than the HS.801, and the misguided are under the impression that we are converting aircraft handed down from British European Airways and Transport Command". The Permanent Secretary to DCAS Air Marshal Hartley, D.J. Pearson, described how the HS.801 was Coastal Command's first new aircraft in years and that



the service was “very proud of it” and so wanted no association to be made with the Comet. Pearson also advised that some Nato nations had described the HS.801 as “merely a Comet, which was very good in its time but which is hardly suitable for the 1970s”.

On June 2, 1966, Wg Cdr Loveland suggested that the name “Scott” should be adopted for the HS.801 because Scott was a famous explorer like Shackleton. The reply from Wg Cdr G.A. Chessworth was non-committal and advised that the CAS, Air Chief Marshal Sir Charles Elworthy, had dictated that the HS.801 was not to be named until the first example had flown. The rationale for this was to avoid the impression that the aircraft’s service entry had been delayed. However, on September 5, Pearson advised that the DCAS had written to AOC-in-C Coastal Command “asking for his recommendations” and that the “selection of a name for the HS.801 should go ahead without delay”. Pearson advised ACAS (OR) that he should inform the MoA and Hawker Siddeley “on the choice of name prior to the preparation of a draft paper for the Air Force Board”.

By September 22 Mr Rawet was writing to all concerned that the HS.801 would indeed be named, and that a shortlist would be prepared before the MoA and HSA were consulted. The shortlist included Trenchard (with a comment about it being reserved for a supersonic aircraft), Albatross and five others that had been “considered but rejected earlier” — and, of course, Nimrod. Even at this late stage more names were appearing including “Avenger, Bowhill, Tempest and Tornado”, suggested by AOC-in-C

Coastal Command in case Nimrod was rejected.

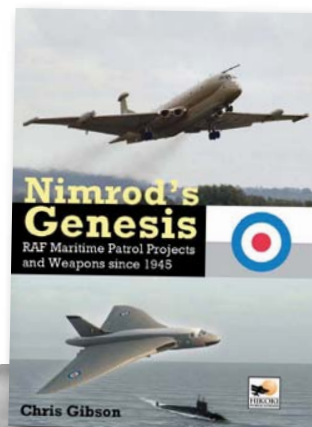
Interestingly, the copy in The National Archives at Kew has “My choice is SCOTT” scribbled on it by a source identified only as DDOR 8. Five days later another two suggestions, “Scorpion” and “Explorer”, arrived from the office of Air Cdre R.G. Knott. The AMSO had also changed his mind, suggesting “Calshot”, as it had been a flying-boat base with a long association with maritime patrol.

AND FINALLY... NIMROD!

On May 23, 1967, HS.801 prototype XV148 made its first flight. Some 12 days later, Mr F. Anderson, of the MoA Air B1 Mods, issued a short statement: “It has been decided that the name ‘Nimrod’ shall be given to the HS.801 Maritime Reconnaissance Aircraft, which is hereby designated Nimrod MR Mk 1”. There had been 40 names in the hat, and AOC-in-C Coastal Command Air Marshal Paul Holder’s favourite had been selected. The question is — did anyone run a book and have their money on Nimrod?



CHRIS GIBSON is the author of *Nimrod's Genesis* (ISBN 978-1-90210-947-3), the forthcoming comprehensive history of the RAF's maritime patrol projects and weapons since 1945, to be published by Hikoki Publications in October 2014. For more info visit the website at www.crecy.co.uk



Nimrod MR.1s at RAF Kinloss, the base on the Moray Firth in northern Scotland which would go on to become synonymous with the type.



SABENA'S CITYHOPPERS



One of a series of superb Kodachromes taken by MIKE HOOKS at the Sabena heliport at the Groendreef in Brussels during the airline's rotary-wing heyday. The Groendreef, also known as the Allée Verte, was a filled-in canal and was opened on August 1, 1953, guests at the opening ceremony including Igor Sikorsky and Gp Capt Peter Townsend. The Citroën building remains at the location today.

After the Second World War Belgium found itself at the heart of a new Europe. Within a 200-mile radius of Brussels were 75 million people; some 140 cities with a population of more than 50,000 were well within reach of a relative newcomer to the transport scene — the helicopter. **BOB RONGÉ** details Sabena's innovative use of rotary-wing aircraft and their unique ability to deliver customers direct to the heart of Europe's bustling cities





BY THE END of the Second World War, Belgium's national carrier — *Société Anonyme Belge d'Exploitation de la Navigation Aérienne*, or Sabena — was one of Europe's leading airlines, having operated invaluable regular services for the Allies in Africa throughout the conflict. Having re-established its European services by the end of 1945, the airline continued to grow, and, with the delivery of Douglas DC-4s, a transatlantic service was opened in June 1947. Sabena's African operations also saw a post-war upswing in passengers travelling to the thriving Belgian Congo.

AIR MAIL WHIRLYBIRDS

By August 1950 Sabena's directors had been convinced of the value of the helicopter for domestic routes, and, on August 21 that year, the company inaugurated an experimental helicopter postal service in co-operation with the Belgian Post Office. Using a fleet of three Bell 47D-1s, the airline operated a 270-mile (435km) circular route linking nine major Belgian cities: Brussels, Libramont, Liège, Tongeren, Hasselt, Beringen, Turnhout, Herentals and Antwerp, ending back at Brussels. Taking 4hr to complete, the service was the first helicopter postal service in Europe. The Dutch city of Maastricht would later be added to the network.

The first two Bell 47Ds were delivered in the

ABOVE *The first of Sabena's helicopters, Bell 47D OO-UBA (c/n 179), was used for the airline's postal service from 1950, and was re-registered as OO-SHX in 1952. It was sold in 1954 to a new owner in Sweden, where it was registered SE-HAI. It later went to India, where it became VT-DVT. It was destroyed in a non-fatal fuel-starvation incident in February 1969.*

early summer of 1950 as air cargo aboard Sabena Douglas DC-4 OO-CBF, which had made a special flight to the USA to collect the machines. The third followed aboard DC-4 OO-CBH shortly afterwards. The helicopters were initially registered as OO-UBA, 'UBB and 'UBC, but were re-registered in July 1952 as OO-SHX, 'SHY and 'SHX respectively. In February 1953 they played an important role in rescue operations following floods in the Dutch Zeeland province in southern Holland. All were sold in early 1954.

Bell 47H-1 OO-SHW was registered to Sabena on September 17, 1957, to be operated by the Belgian Antarctic Expedition, with which it left Antwerp harbour as deck cargo aboard *MS Polarshaw* bound for the South Pole the same year. It returned to Belgium in 1962 and was sold to a new owner in Sweden on October 26, 1962, and registered SE-HBE. Following a spell in Norway as LN-OQG, it was acquired by a new owner in the UK and registered G-AZYB in the summer of 1972. Written off in a forced landing in April 1984, this much-travelled helicopter is now preserved in its distinctive Antarctic orange livery at

The Helicopter Museum at Weston-super-Mare.

In 1953 Sabena made the decision to expand its helicopter operations substantially, and on August 1 that year a dedicated heliport, located on a 330ft x 660ft (100m x 200m) strip of land at the Groendreef/Allée Verte, in central Brussels, was opened by the mayor of Brussels, Baron Joseph Van de Meulebroeck.

INTERNATIONAL SERVICES

On September 1, 1953, Sabena inaugurated its inter-city and international helicopter passenger services, the Bell 47D mail services having proven extremely successful and worthy of expansion. The new ambitious project linked Brussels with Antwerp and Luik in Belgium, Rotterdam and Maastricht in Holland and Lille in France, with planned services to Cologne and Bonn in Germany to start in October 1953. The services were flown with the company's new fleet of seven-passenger Sikorsky S-55s, a total of six eventually joining Sabena.

The first, OO-SHA (c/n 55-458), arrived at Antwerp aboard *MV Bastogne* on July 2, 1953, the remaining five (OO-SHB, 'SHC, 'SHD, 'SHE and 'SHF) all having been delivered by March 1955.

Services to Eindhoven in Holland and Dortmund and Duisburg in Germany were added, the inaugural service to the latter being flown by four S-55s on May 6, 1955. Proving flights to Paris and London were also undertaken but only the former would be selected for service and not until the S-55s had been replaced by Sikorsky S-58s following the sale of the older machines to France's *Armée de l'Air* during April–December 1956. By the end of Sabena's first year of international helicopter operations some 18,000 passengers had been carried.

Eight 12-passenger S-58s were ordered in 1956 to help expand the company's helicopter services further afield, especially in light of the planned service to Paris, a round-trip distance of nearly 350 miles (560km). The first two S-58s (OO-SHG and 'SHH) were delivered aboard the French aircraft carrier *Dixmude* to Algiers, from where they were flown to Belgium via Alicante, Barcelona, Perpignan, Tours and Paris. The remaining six (OO-SHI, 'SHK, 'SHL, 'SHM, 'SHN and 'SHO) had all been delivered by February 1957.

The S-58s entered service at the Groendreef heliport in October 1956, the larger and faster helicopter slashing times between cities and

Seen here departing the heliport at the Groendreef in June 1955, Sikorsky S-55 OO-SHF (c/n 55-842) was one of six purchased new from the United Aircraft Export Corporation during 1953–55, and arrived in Brussels on March 3, 1955. It was sold to the French government in March 1957 to become F-SFWR, but was immediately put into service with the Armée de l'Air as 55-842.

MIKE HOOKS



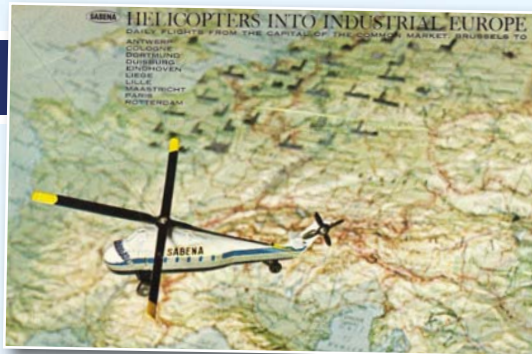
"ALL ABOARD FOR YOUR FLIGHT TO ROTTERDAM . . ."

SABENA MADE ITS inaugural inter-city helicopter passenger flight on September 1, 1953. The scheduled services, using Sikorsky S-55s, were initially operated on three routes: Brussels—Lille (twice daily in each direction); Brussels—Antwerp—Rotterdam (three times daily each way) and Brussels—Liège—Maastricht (daily), with no services on Sundays. The timetables were arranged to coincide with Sabena's international fixed-wing services in and out of Brussels' main airport at Melsbroek.

The S-55s were appointed in a somewhat spartan configuration, with three light tubular-steel seats with armrests backing against the forward bulkhead, three against the rear and two amidships. If luggage was to be carried one of the seats was removed. The cabin incorporated four 18in-square windows, one of which formed the emergency exit. The seats were finished in blue leathercloth, while the walls were grey and maroon, as was the carpet. An intercom system between cockpit and cabin was provided.

A few days before the official inauguration of the service, British aviation magazine *Flight* was invited to sample the Brussels—Antwerp—Rotterdam run, its reporter presenting himself at the Groendreef at 0715hr, when the S-55 made its arrival from Melsbroek. At the controls was former RAF pilot and Sabena's Director of Operations, Anselm Vernieuwe. "Take-off provides the usual helicopter sensation; not uncomfortable, but always a little odd to the fixed-wing-educated", the reporter explained, going on to describe "a slightly rearward balloon-like rise to 20ft [6m] or so, then a swing forward and a normal aeroplane-like climb-away". The S-55 on this occasion carried six passengers and two pilots, although the service was usually a one-pilot operation. The report continues: "As soon as we were above the house-tops it became apparent that we were in for some interesting weather; just the thing, in fact, to show how this kind of air service can perform". As the thickening mist turned to drizzly cloud, Vernieuwe dropped from 1,000ft (305m) to 300ft (90m), while retaining the helicopter's 80kt (150km/h) groundspeed, the reporter noting that "there can be few flatter obstruction-free flying areas anywhere in Europe". After a brief stop at Deurne Airport — there was as yet no heliport at Antwerp — the S-55 continued on to Rotterdam, "and as we crossed the mighty Maas with its usual fleets of giant barges the weather began to clear; by the time the S-55 was dropping in over the docks the sun was shining". The heliport at Rotterdam was a trim square lawn with a 60ft x 60ft (18m x 18m) concrete apron at its centre, within short walking distance of the City Hall. "It was still early — 8.20 a.m. — and soon the railings were lined with interested office-bound citizens".

After a quick refuelling of the S-55, the reporter was on his way back to Antwerp and Brussels. The helicopters were refuelled to allow for a 45min reserve; allowing for 400lb (180kg) of fuel the S-55s carried a 1,750lb (795kg) payload. Although the services were subsidised by the Belgian government, the airline was determined to prove the value of the helicopter for inter-city services. *Flight's* reporter explained: "Sabena is going to need very high load-factors to make its low fares an economical proposition; but it is prepared to stake a good deal on making the Low Countries truly helicopter-minded by the time it is able to re-equip with large helicopters, in three years or so".



The Groendreef heliport was a 5min walk from the Palace Hotel in the Place Rogier, close to the city centre, and was thus perfectly situated for helicopter operations direct to the heart of Brussels. Here S-55 OO-SHE (c/n 55-841) lifts off from the heliport on June 25, 1955.

MIKE HOOKS





ABOVE During 1956–57 Sabena replaced its S-55s with the faster and larger S-58, OO-SHL (c/n 58-388) arriving in Brussels in early January 1957. It is seen here in June 1958 at the international airport at Melsbroek/Zaventem, six miles (10km) north-east of the heliport, and where the Sabena helicopter fleet was officially based and maintained.

providing much-improved economy for the airline. On a proving flight from Brussels to Paris one of the S-58s set a new helicopter speed record between the two cities, the flight taking 1hr 16min. Paris was finally added to the network from 1957, all eight S-58s flying on the inaugural Paris service.

On June 15, 1957, Sabena celebrated the carriage of its 100,000th helicopter passenger, an occasion celebrated by the issuing of a special stamp by the Belgian Post Office. In May 1958 the heliport at the Groendreef was extended to cover some 495ft x 1,970ft (150m x 600m).

In April 1960, S-58 OO-SHO (c/n 58-432) was sold to a new French owner, Compagnie Gyr-afrigue, with which it was registered F-OBON. Leased to Italian company Elipadana for a short period in 1960, OO-SHN (c/n 58-410) went to Japan as JA7067 in September the same year. Why these two were sold at this point remains unclear, but in June 1963 two additional S-58s, N878 (c/n 58-350) and N869 (c/n 58-836), were leased from Chicago Helicopter Airways in the USA, the machines becoming OO-SHP and OO-SHQ respectively in November 1964, when they joined Sabena permanently. Only one S-58 was written off in Sabena service, OO-SHK (c/n 58-363) coming to grief during a test flight from Evre, a suburb of Brussels, on May 5, 1961. Both crew members escaped with only minor injuries.

The S-58s provided sterling service until 1963, when they started to be transferred to the Belgian Air Force. The last Belgian civil-registered S-58

went to the Air Force in 1969. Two former Sabena S-58s were lost in accidents after transfer to the military. With serial B9 (code OT-ZKI), the former OO-SHG (c/n 58-324) was written off in a very heavy landing at Koksijde on September 21, 1964; there were no injuries to the crew. Originally OO-SHM (c/n 58-395) in Sabena service, S-58 B13 (code OT-ZKM) was destroyed after the pilot lost control of the helicopter in a suburb of Aachen in Germany on October 15, 1971.

The remaining ex-Sabena S-58s were operated by the Belgian Air Force until the late 1970s, when the Westland Sea King entered service. All were then sold to German company Meravo, based at Oedheim near Heilbronn in southern Germany. One example, the former OO-SHI (c/n 58-356), is preserved and on display at the Auto und Technik Museum at Sinsheim. The former OO-SHL (c/n 58-388) has been semi-restored and is parked outside Frankfurt airport. Of the other former Sabena S-58s, OO-SHH (c/n 58-333) was broken up and used for spares for OO-SHP, which was retained by Meravo and maintained in airworthy condition as D-HAUG; it is the only airworthy S-58 in Europe and is currently painted in German Army markings as PJ+366. The former OO-SHQ was reported in 2007 as preserved at Laupheim.

DRAFTING IN RESERVES

In 1958 Belgium played host to the first post-war World's Fair, a new park being built in Brussels for the event. To ferry visitors to and from the site, a helipad was constructed in the



EXPO '58: A VINTAGE YEAR

IN NOVEMBER 1953 Belgium was selected to hold the first post-war World's Fair, the Belgian government opting to use the Heysel plateau, four miles (7km) north of the centre of Brussels, as used for the Brussels International Exposition of 1935, to establish a purpose-built venue for the occasion, which was to be held in 1958. The 490-acre (2km²) site took nearly 15,000 workers more than three years to prepare, the Fair being declared open on April 17, 1958. One of the most notable — and long-lasting — exhibits was the Atomium, a structure of connected stainless-steel-clad spheres designed by André Waterkeyn to represent a unit cell of an iron crystal magnified 165 billion times. It is still a distinctive landmark on the Brussels skyline today.

LEFT The cover of a Sabena promotional booklet for Expo '58.



A pair of S-58s, OO-SHL (nearest) and OO-SHH, await their next flight from the Groendreef. The distinctive domed building at the nearby Place de l'Yser is visible in the background. The heliport was finally closed in June 1965 and was developed into Parc Maximilien, a landscaped residential area.



MAP BY MAGGIE NELSON

ABOVE Sabena's helicopter network served up to 11 major European cities from Brussels at the peak of the airline's rotary-wing operations. Trial flights to London were also made, but a service was never inaugurated. **BELOW** Two of Sabena's leased helicopters, a Vertol 44A and Widgeon, at the exhibition helipad during Expo '58.

exhibition grounds, and this was declared open on April 17, 1958, the exhibition running until October 19 the same year.

The event was to provide an important boost for Sabena's helicopter operations, and steps were taken to ensure that the company could meet the demand for its services. Accordingly, Sabena leased a pair of Vertol V44A twin-rotor helicopters, N74057 (from New York Airways) and N74058, from Schreiner Aerocontractors, the type's European sales representative. After six months of shuttling between the city centre, the airport and the exhibition grounds the aircraft were returned, N74057 resuming service with New York Airways and N74058 becoming a

Vertol demonstrator with Schreiner in Europe.

Also operated for the duration of the exhibition was Westland WS-51 Widgeon G-ANLW, which was leased from Westland in April 1958 and painted in Sabena colours. The Widgeon and the V44As were used extensively to fly visitors to the exhibition grounds and were also employed on local pleasure flights during the exhibition, Sabena's helicopters carrying more than 65,000 passengers over the course of the memorable summer of '58.

The Widgeon was returned to Westland in October that year. The company's helicopter operations during the exhibition had been a triumph, and less than a year later, in September



PETER KEATING © A FLYING HISTORY LTD



ABOVE Sporting the Expo '58 star logo on its nose and Sabena colours, Westland Widgeon G-ANLW served with the airline for the duration of the exhibition. It later went on to appear in some dynamic flying sequences in the obscure 1974 film *Caravan to Vaccares*. It is now on display at the Norfolk & Suffolk Aviation Museum at Flixton.

1959, Sabena celebrated carrying its 250,000th helicopter passenger. Sabena was also involved in the operations and maintenance of helicopters flown on behalf of third parties.

AFRICAN HELO SERVICES

During 1951–52 the *Gouvernement Générale du Congo Belge* (Belgian Congo Government) purchased three Westland S-51 Mk 1Bs, which were registered as OO-CWA (c/n WA/H/30), 'CWB (c/n WA/H/29) and 'CWC (c/n WA/H/48). Used for special operations such as insecticide spraying, these were maintained and operated by Sabena personnel but never wore Sabena colours.

The S-51s were operated until 1955, when they were replaced by three S-55s that March. These were: OO-CWE (c/n 55-825); 'CWF (c/n 55-839) and 'CWG (c/n 55-840). Again Sabena handled all maintenance and operations in the Belgian Congo, but this time all were painted in the Sabena colour scheme. The first of the S-55s,

OO-CWE, crashed at Mossendjo on January 29, 1958, and the other two were transferred to the Congolese military in April 1960.

In November 1957 the Belgian Congo authorities also acquired a Sud-Est SE.3130 Alouette II, which operated as a sprayer. Registered OO-CWH (c/n 1099), it flew over the Congo waterways to drop defoliation chemicals on fast-growing water hyacinth that hindered ship operations. The Alouette was transported to Belgium in July 1959 and ownership was officially transferred to Sabena, which re-registered it as OO-SHV. In early 1968 it was sold on to the Israeli Air Force.

In 1960 Sabena explored the possibility of updating its helicopter feet with Sikorsky's new S-62 model, which incorporated a gas turbine engine in the form of the General Electric T58 and an amphibious boat-type hull. The company obtained a single example, N976 (c/n 62-007), on lease for evaluation purposes in May 1960 and used it for about four months on the Brussels—

Sud-Est Alouette II OO-SHV at Melsbroek/Zaventem in the mid-1960s. After operations with Sabena in Africa and Europe, it was sold to the Israeli Air Force in January 1968 and served with the latter's 125 Sqn as "014". It was finally withdrawn from service in May 1975.

PETER KEATING © A FLYING HISTORY LTD





This image from one of Sabena's early 1960s promotional booklets, Jet'n'Copter Flight Seeing, emphasises the airline's ability to land within a few minutes' walk of the Belgian capital's landmarks, like the Atomium and the spire of the Town Hall — which are nowhere near each other in reality!

DAVID H. STRINGER COLLECTION

Eindhoven—Duisburg—Dortmund service. The type made a favourable impression, but times were changing and it had been returned to Sikorsky by March 1961.

HELICOPTERS IN THE JET AGE

By 1962, with declining load factors and an eye on the increased need to squeeze more profit from fewer services in the expensive new jet age, Sabena decided it was time to re-evaluate its helicopter operations. Despite the popularity and efficiency of its rotary-wing services, Sabena made the decision to suspend its helicopter operations at the end of the 1962 summer season, and preparations were made to transfer the S-58s to the military. The Board emphasised that operations may resume when economical all-weather helicopters became available, but widespread protests led to the Ministry of Transport reinstating its helicopter operations to Maastricht, Eindhoven and Rotterdam in The Netherlands, and Cologne and Duisburg in West Germany. Gone were the services to Paris, Lille, Antwerp and Dortmund. With a number of S-58s having already been transferred to the military, it was at this point that S-58s OO-SHP and 'SHQ were brought on strength from Chicago Helicopter Airways, as mentioned above.

The original idea behind Sabena's innovative helicopter services — that rotary-wing or VTOL aircraft with a range of some 200 miles (325km) were significantly faster, in terms of travel time, than fixed-wing aircraft, owing to their ability to land closer to city centres — had been proven

brilliantly. But it was a market that had built-in growth restrictions. With the comparatively small number of passengers carried on each flight, the load factors became a knife-edge and total costs could not be sufficiently reduced to justify the investment in larger helicopters (even if suitable machines had been available at the time), leaving the Belgian government with the responsibility of significant subsidisation for the helicopter service, which it had shouldered in the form of the original generous mail contract. (Sabena's rotary-wing passengers were charged approximately half the real cost of the operation.)

It is interesting to note that, in 1961, *New Scientist* magazine stated that the price paid for conventional fixed-wing services between London and most European cities was between approximately 6d and 8d per passenger-mile; "No pure helicopter can compete with or even approach that rate", the report declared. It continued: "The cost of operating the best of those now in service [a reference to Sabena] works out at about 3s per passenger mile, usually reduced to about 1s 6d for the passenger with the help of subsidisation".

It was hoped that within five to eight years technology would evolve and larger, more efficient helicopters capable of carrying up to 50 passengers would be developed, resulting in the holy grail of significantly lower seat-mile costs. Unfortunately, these expected results did not materialise and finally, on November 1, 1966, Sabena decided to stop all helicopter services. During its 13 years of operation, the Sabena helicopter division had flown more than 7 million miles in 77,000 flying hours — with a mere 25 full-time pilots.



Dornier Do 24T-2 WNr 3343 after it had been flown to Sweden by deserting German flight mechanic Heinz Roesch in October 1944.



BEFORE & AFTER

ROGER TISDALE and ARVO VERCAMER trace the colours of a Tp 24 flying-boat, originally a Luftwaffe Dornier Do 24 that was flown to neutral Sweden in 1944

EQUIPPED WITH DORNIER Do 24T flying-boats, the Luftwaffe's *Seenot-gruppe 81* (Search-and-rescue Group 81 – SNG 81) was formed on August 19, 1944, at Bug on Rügen Island, in the Baltic Sea. The unit was commanded by *Kapitän* Karl Born, who, at the end of the war, achieved some distinction for his evacuation of 99 children and 17 adults in a Do 24 from the Soviet Union's advancing army.

On October 31, 1944, a Do 24T-2 of SNG 81, *Werknummer* 3343, marked CM+RY, alighted near the coast of Blekinge in southern Sweden. At the controls was Heinz Roesch, a young German flight mechanic, who was accompanied by his Estonian girlfriend, Rita Kuusalu, both seeking to escape from the chaos of the collapsing Third Reich. The aircraft was virtually factory-fresh,

having accrued a mere 12hr total flying time.

In January 1945 the flying-boat was officially purchased from Germany for 250,000 Swedish *Kronor*. By May 1945 its original German RLM 72/73 paint scheme had been replaced by an overall dark green colour called *Ubåtsfärg*, or "Submarine Green", and it was flown to Wing F 2 at Hägernäs, near Stockholm.

Designated Tp 24 in *Flygvapnet* (Swedish Air Force) service, and given the serial number F 2-90, the freshly-recycled flying-boat was employed for a while as an air-sea rescue aircraft until *Flygvapnet* received Consolidated Catalinas (designated Tp 47s) in 1947. The Tp 24 was then relegated to second-line duties until 1951 when it was withdrawn at Västerås owing to the lack of spare parts. It was finally scrapped during the following year.



In order to try and keep the Tp 24 in flying condition, Flygvapnet groundcrew obtained parts from various other types, including the Saab B 17, Heinkel He 115 and even J 22 fighter. It was a losing battle, however, and the Tp 24 was retired in the summer of 1951.





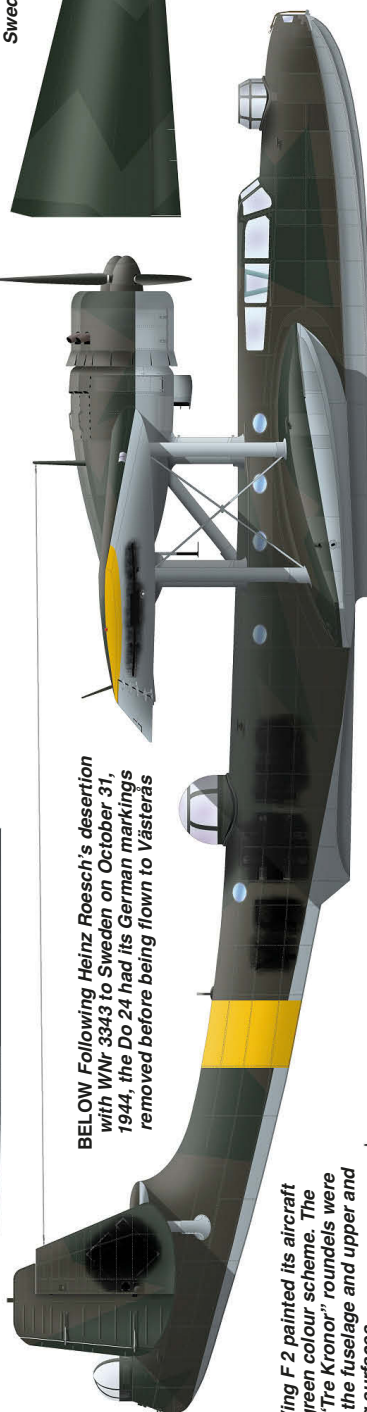
BELOW Dornier Do 24T-2 WNr. 3343, CM+RY, in the colours it wore while operating with SNG 81 at Bug. The aircraft had been assembled by Fokker in Amsterdam, from parts supplied by Aviolianda



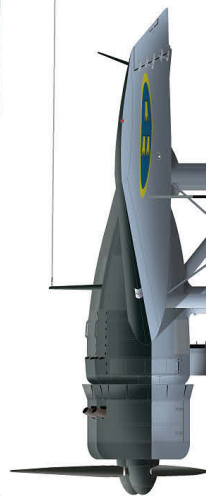
TOP LEFT AND BELOW The upper surfaces of the Do 24 were painted in the standard two-colour "splinter" camouflage scheme applied to all SNG 81 aircraft. The German cross was removed on its arrival in Sweden, as seen below



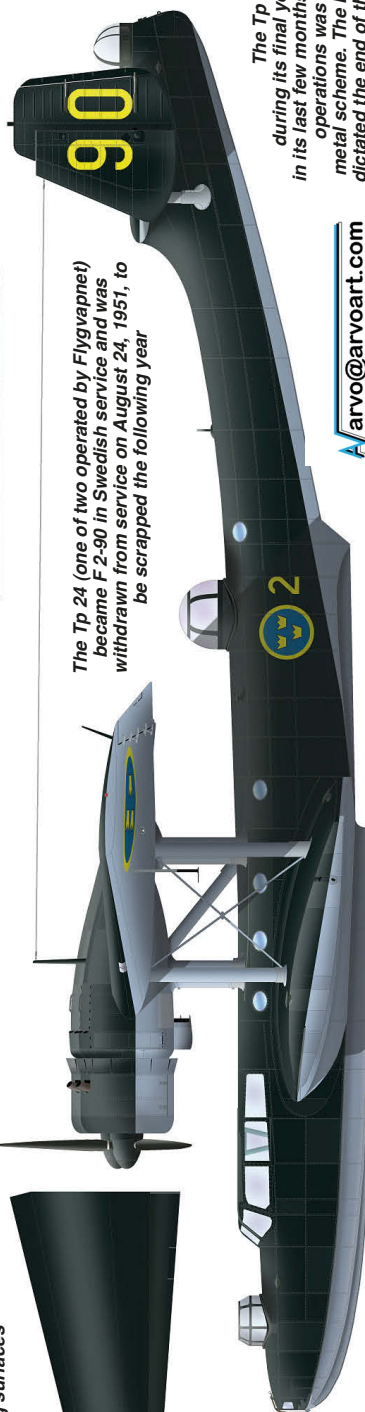
BELOW Following Heinz Roesch's desertion with WNr. 3343 to Sweden on October 31, 1944, the Do 24 had its German markings removed before being flown to Västerås



BELOW Wing F 2 painted its aircraft in a dark-green colour scheme. The service's "Tre Kronor" roundels were applied to the fuselage and upper and lower wing surfaces



The Tp 24 (one of two operated by Flygvapnet) became F 2-90 in Swedish service and was withdrawn from service on August 24, 1951, to be scrapped the following year



The Tp 24 flew some 69hr during its final year of service, and in its last few months of air-sea rescue operations was finished in a bare-metal scheme. The lack of spare parts dictated the end of the aircraft's career

FRONT-LINE REPORTER

Following on from his survey of the Northrop P-61 Black Widow in post-war civil service, **MICHAEL O'LEARY** does the same for its photo-reconnaissance variant, the muscular F-15 Reporter, only one of which found its way on to "civvy street". He profiles its career as a testbed, photo-survey aircraft and fire-bomber — and ultimately its fiery demise



ARGUABLY MORE ELEGANT than Northrop's original P-61 Black Widow variants, the F-15A Reporter was created as a long-range high-altitude photographic-reconnaissance platform, developed from the XP-61E long-range day fighter. The United States Army Air Forces (USAAF) established a requirement for 320 F-15 Reporters, but only 36 F-15As were built — these being created from partly-completed P-61C airframes — when the contract was suddenly cancelled during 1947.

By the mid-1950s the F-15As had been phased out of service and the majority were scrapped at overseas bases. However, one F-15A did survive; the first production example, serial 45-59300. Completed on May 15, 1946, the aircraft was transferred to the National

Advisory Committee for Aeronautics (NACA — forerunner of today's National Aeronautics & Space Administration — NASA) on February 6, 1948, and flown to Ames Laboratory at Moffett Field, bordering San Francisco Bay in California. With numerous modifications, the F-15A — carrying military insignia, NACA logo and large "TEST" legend on its fins — was used as a high-altitude drop aircraft.

Chugging up to 40,000ft, the F-15A pilot would release aerodynamic test bodies instrumented to record their characteristics as they fell to earth. The F-15A made approximately 50 drop sorties testing a variety of shapes over the Edwards Air Force Base Bomb Drop Range.

Even though it was the early 1950s and the aircraft was relatively new, parts were nevertheless hard to find and the F-15A was



ALL PHOTOGRAPHS VIA AUTHOR

The sole Northrop F-15 Reporter to see service in private hands, the first production model, 45-59300, is seen here in its final red, white and bare-metal scheme at the US Forest Service's Fresno Air Attack base in July 1967. The Reporter was based on the P-61 Black Widow, retaining the latter's wings, powerplants and twin booms, but incorporating a more streamlined fuselage which accommodated the two crew beneath a "bubble" canopy.



ABOVE In February 1948 F-15A serial 45-59300 was sent to Moffett Field in California to test various advanced swept-wing designs by dropping recoverable aerodynamic test bodies from high altitude. A P-61C, 43-8330, was also used in the trials and is now on display at the Smithsonian Institution's Steven F. Udvar-Hazy Center.

parked, stripped of its engines, propellers — and, oddly — the canopy (at the time, the largest blown-Plexiglas structure). The government put the hulk up for sale and it was snapped up during April 1955 by Steward-Davis Inc of Long Beach, California.

BACK INTO SERVICE

The company was well known for maintaining and rebuilding surplus military aircraft, and is perhaps best remembered for its later work converting a fleet of Vultee BT-13 and North American AT-6 trainers into replicas of wartime Japanese torpedo-bombers for the 1970 film *Tora! Tora! Tora!* The government wanted the F-15A off its property so Steward-Davis sent a group of workers to Moffett Field to tow the aircraft to San Jose Municipal Airport, where it was fitted with a pair of Pratt & Whitney R-2800 engines

and propellers while a Lockheed T-33 canopy was obtained to replace the original unit.

The Civil Aeronautics Administration (CAA — forerunner of the Federal Aviation Administration) — issued an airworthiness certificate in the Restricted category and the aircraft was given the civil registration N5093V on July 16, 1956, on which date it was flown to Long Beach. Realising the Reporter's potential, the company rebuilt the aircraft and fitted it out for its original intended role, high-altitude photographic-survey work.

By October 1956 the work was finished and the aircraft was advertised for sale, soon finding a buyer in Mexico — Cia Mexicana Aerofoto SA — for \$70,000, thus returning a good profit on the company's investment. The aircraft headed south of the border, where it took up the Mexican civil registration XB-FUJ.

The Reporter at Long Beach following its ferry flight from San Jose in July 1956. The Steward-Davis team had given the aircraft an all-over coat of yellow-green anti-corrosion zinc chromate and sprayed its new civil registration, N5093V, rather crudely on the booms.



In late 1956 the F-15A was sold to a new owner in Mexico, Cia Mexicana Aerofoto, with which it served as XB-FUJ in a flamboyant red and white colour scheme. It is seen here awaiting another sortie in March 1957.



Finished in an attractive red-and-white colour scheme, the F-15A was operated in Mexico for seven years before being put up for sale on January 27, 1964. On March 3 the same year the FAA recorded the sale of the aircraft to Aero Enterprises of Willows, California, "for and in consideration of \$1". The company operated numerous fire-bombers and was keen to add the F-15A to its fleet. The aircraft was returned to Steward-Davis to be stripped and modified.

On April 17, 1964, the Reporter received its airworthiness certificate in the Restricted category and was registered N9768Z. After all the modifications were complete, the aircraft was delivered to Cal-Nat Airways (which had taken out a lease on the machine) at Grass Valley Airport in the scenic Californian Sierra Nevada mountains. It was here that the next round of modifications began, including the installation of

a tank for 1,600 US gal (6,050lit) of fire retardant under the fuselage. Numerous other modifications were also completed and the aircraft was finished in a yellow, white and bare-metal colour scheme. It was then flown to the US Forest Service's Fresno Air Attack Base in the San Joaquin Valley, which would become the Reporter's home base.

THE PREGNANT WIDOW

Retardant is very heavy — approximately 10lb/ US gal (1kg/lit) — and in the hot summer months the F-15A's performance was less than sparkling when it took off at its gross weight of nearly 42,000lb (19,000kg). The aircraft had been named *The Pregnant Widow* and Cal-Nat decided that the troublesome Curtiss Electric propellers had to go. After extensive modifications, Hamilton Standard Model 24E60-75/6359A-24S propellers

After seven years of sterling service south of the border the Reporter returned to the USA in 1964 to be overhauled by Steward-Davis at Long Beach, where it is seen here after a comprehensive paint-stripping and bearing its new registration, N9768Z, on the booms.





ABOVE A pilot of Aero Enterprises poses beside the Reporter in its distinctive new colour scheme of yellow, white and bare metal in July 1964. Note the rather inelegant 1,600 US gal belly tank installed beneath the fuselage.
BELOW The F-15A's data plate, which states "9-1-46" as its date of manufacture, actually its acceptance date.

took their place. Although these offered an improvement, propeller changes continued. Blades from a Vought F4U-4 Corsair improved climb by eight per cent and take-off performance by some 15 per cent. In 1967 a final change was made to use -34S blades from a Lockheed L-1049 Super Constellation.

In March 1968 the aircraft was purchased — along with its 1968 California Division of Forestry contract — by TBM Inc of Tulare, California. Fresno remained its base and pilot Ralph Ponte, who was flying the Reporter for Aero Enterprises, transferred his duties to TBM. Ponte was one of three pilots rated on the aircraft and was also a licensed Airframe & Powerplant Inspector able to sign off modifications and annual inspections on the Reporter.

A HEROIC RESCUE

On September 6, 1968, several large fires were under way and Ponte and the Reporter were launched from Fresno to attack a fire near Hollister, some 90 miles to the west. Ponte roared in on the fire and let go with 1,600 US gal of retardant before pulling up and heading to Hollister (also home to an Air Attack Base) for another load. Because of the 4,250ft (1,295m) runway and high temperatures, only 1,200 US gal (5,285lit) of retardant was pumped into the Reporter's massive tank.

At just after 1800hr Ponte prepared to launch from Runway 23 at Hollister for his second mission of the day. The Reporter was approximately 700lb (320kg) under gross weight and Ponte brought the R-2800s up to 25lb/in² manifold pressure and 2,800 r.p.m. before releasing the brakes. The Reporter began

to pick up momentum as it thundered through the hot, dry air. But at about 600ft (180m) from the end of the runway was a low rise of 200ft (60m). Ponte knew that to clear the rise the F-15A had to be airborne about 3,500ft (1,060m) down the runway. With power still all the way up, the F-15A stuck firmly to the ground, although it was rapidly accelerating as it went past the "point of no return" mark. Ponte thought the radials were not developing full power so he aborted the take-off, pulled the power back, cut off all systems

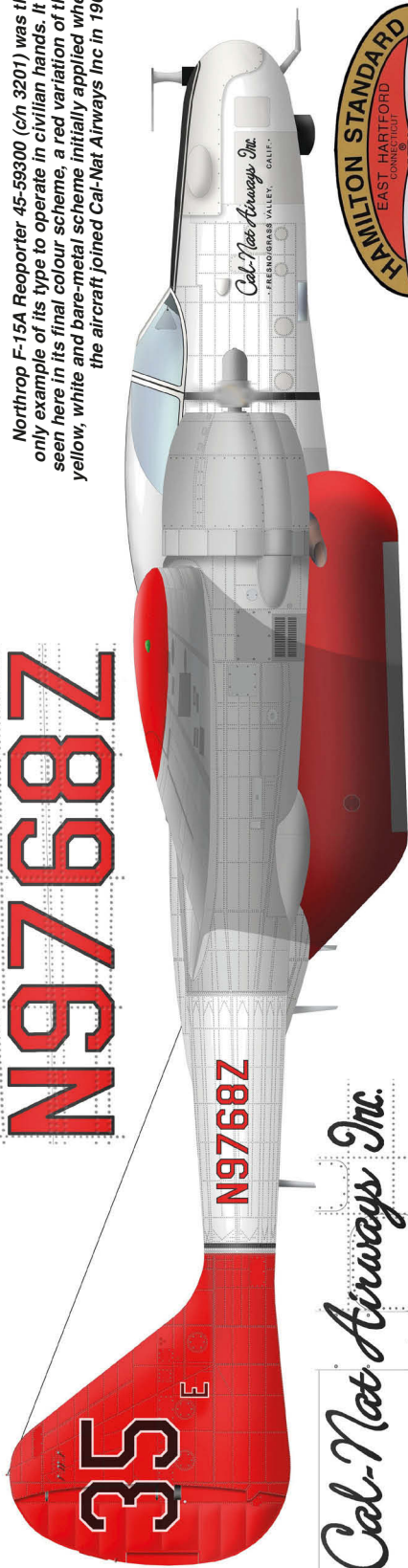
and stood on the brakes. Smoke was pouring from the tyres as the F-15A sailed off the runway and ploughed through a field of green peppers. There was a dirt road and embankment at the base of the rise and when the F-15A hit the rise, the undercarriage was torn off and the Reporter came to rest on the side of the hill.

Ponte was momentarily knocked out. Structural damage to the aircraft was extensive and a fuel tank was ruptured, spilling its contents on

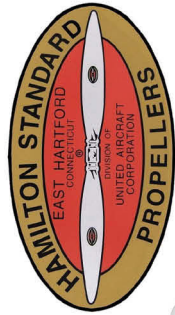


N9768Z

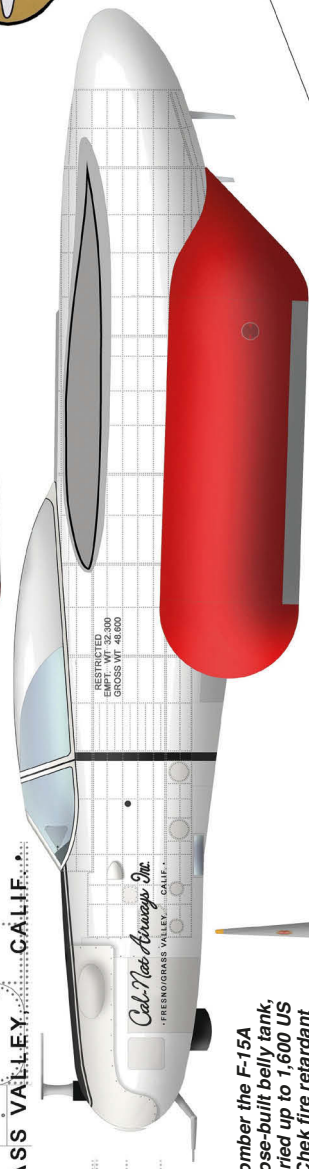
Northrop F-15A Reoporter 45-59300 (c/n 3201) was the only example of its type to operate in civilian hands. It is seen here in its final colour scheme, a red variation of the yellow, white and bare-metal scheme initially applied when the aircraft joined Cal-Nat Airways Inc in 1964



Cal-Nat Airways Inc.
• FRESNO/GRASS VALLEY, CALIF. •

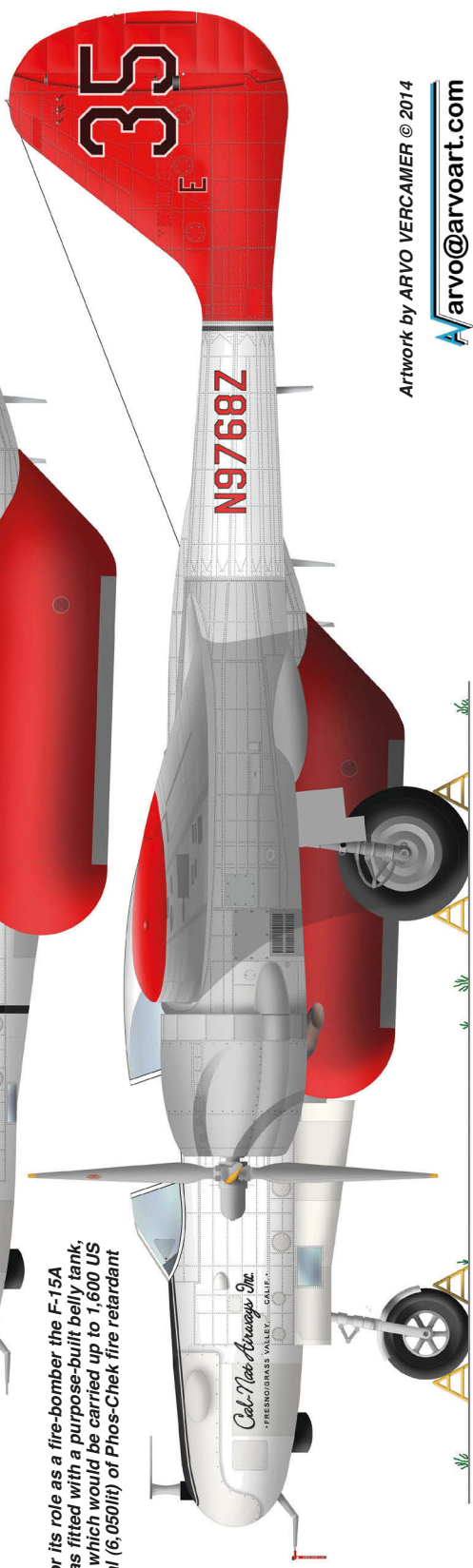


The F-15A was ultimately fitted with Hamilton Standard props, which bore the company's logo



RESTRICTED
EMPT. WT 32,300
GROSS WT 48,600

For its role as a fire-bomber the F-15A was fitted with a purpose-built belly tank, in which would be carried up to 1,600 US gal (6,050lit) of Phos-Chek fire retardant



Artwork by ARVO VERCAMER © 2014

arvo@arvoart.com



ABOVE *With power all the way up, the Reporter begins its take-off roll at Porterville, California, during August 1968, by which time the aircraft was operating with TBM Inc and the yellow parts of the colour scheme had been replaced with vivid red. The following month the aircraft's flying career came to an end during a take-off accident.*

to hot metal. Flames broke out in the port nacelle and gained a hold on the airframe. Bob Johnson, who was at Hollister that day, later recalled:

"A [Boeing] B-17 pilot was sitting in his cockpit with the engines shut down while the Fort was being refuelled and reloaded . . . the pilot radioed 'Mayday! Mayday!' on the forestry frequency to any fire-bomber with a full load to return to base. A [Grumman] TBM pilot, approaching his target, heard the call and turned the Avenger back. Lowering the nose to gain speed, the pilot could see the rising cloud of smoke. Spotting the Reporter, he came in low and dropped half a load on the F-15A.

"Dropping his port wing, the pilot pulled a

tight turn and returned to the F-15A, letting loose with the other half. The cockpit area was covered with pink Phos-Chek retardant as Ponte came to and dazedly climbed out and away from the 'plane. If it hadn't been for Carl Kennedy, the TBM pilot, Ponte would have burned to death."

After an investigation, Gee-Bee Aircraft Parts of San Jose cut the Reporter apart and hauled it to its yard where pieces remained well into the early 1980s. TBM Inc retained some F-15A/P-61 spares, which were later passed to the Mid-Atlantic Air Museum at Reading, Pennsylvania, for its ongoing restoration of P-61B 42-39445. The first — and last — Northrop F-15A died having accrued just 1,571 flying hours.



The crumpled remains of the Reporter at Hollister after its accident in September 1968. Fortunately the pilot, Ralph Ponte, was able to escape from the wreckage with only minor injuries. The aircraft never flew again, and thus the civil career of the Reporter drew to a close after a very creditable 20 years of service.

CONVAIR CV 440 METROPOLITAN AIRCRAFT FOR SALE



Convair CV 440 ZS-BRV for sale Powered by Pratt & Whitney R-2800-CB16 engines

Together with a full complement of spares and aircraft components from a second Convair 440

THIS IS AN EXCLUSIVE OFFER OF
TWO AIRCRAFT FOR THE PRICE OF ONE

FULL SERVICE HISTORY AVAILABLE

◆ Technical information:

1. Type, as stated on the Certificate of Airworthiness (manufacturer's serial plate number):

Convair CV 440 ZS-BRV 215-54-2813

2. Crew capacity: 2-3

3. Number of seats: 44 luxury leather first class
Plus spares – 44 additional luxury leather seats

4. Galley equipment: not applicable

5. Year of manufacture and airframe hours:
built in 1954, ZS-BRV – 18,109hrs, plus spare
airframe – 17,632hrs

6. Engine type and hours: Pratt & Whitney
R-2800-CB16 engines, ZS-BRV – 102hrs & 166hrs,

plus 2nd aircraft spare engines – 325hrs & 1,059hrs

7. Garmin GPS equipment fitted plus spares:

1 x Garmin GNS 530; 1 x Garmin GNS 430;

1 x RDR 2000 colour weather radar system;

1 x Bendix King KN 64 DME;

2 x Bendix King KR 87 TSO ADFs;

2 x Garmin GTX 327 transponders;

1 x Garmin GMA 340 intercom system;

1 x AICD Avionics Innovations CD player and
tuner with NAT AA20-431 amplifier

◆ This aircraft is based at Wonderboom,
Pretoria, South Africa.

◆ Ferry flight delivery to end destination can
be arranged (this will entail liability).

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IT'S ALL



GREEK...

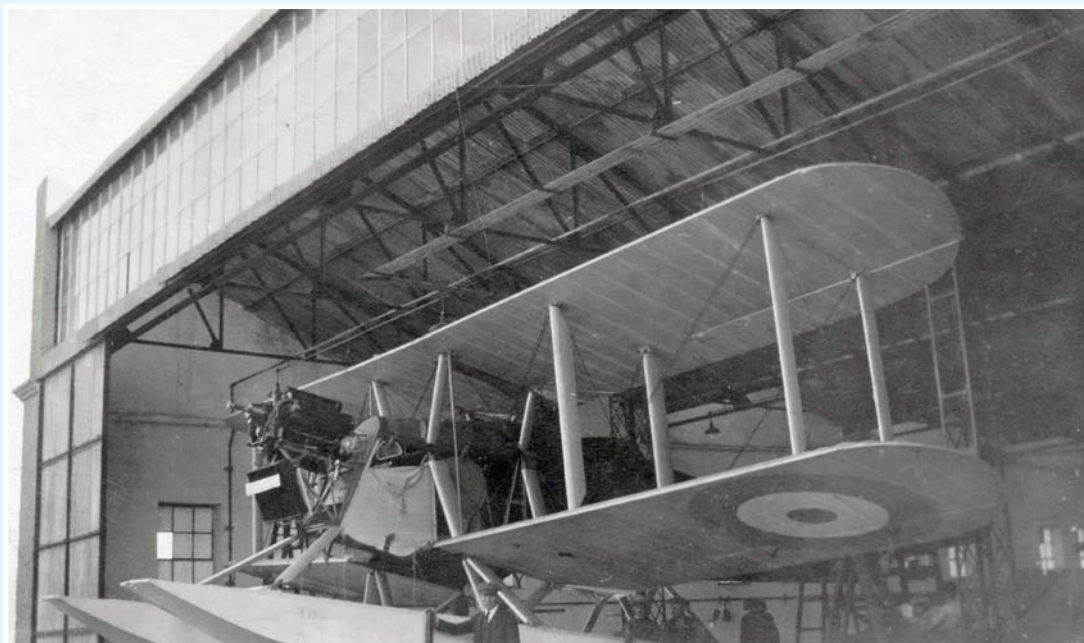


In July 1925 the Blackburn Aeroplane & Motor Co took over the construction and operation of the Greek National Aeroplane Factory near Athens, where construction of Velos torpedo-bomber biplanes began immediately. **PHILIP JARRETT** uncovers some previously unpublished photographs taken by a Blackburn employee at the factory, some of which show an extremely obscure and little-photographed machine

THE PHOTOGRAPHS INCLUDED in this picture-feature were all taken at the Greek National Aeroplane Factory (KEA) at Old Phaleron, near Athens, adjacent to the Naval Air Base, in about 1926-27. They were probably taken by an employee of the Blackburn Aircraft Company, which had taken over and completed construction of the factory during the second half of 1925. Blackburn had also obtained a five-year contract to run the factory and began to manufacture its own Velos seaplanes for the Greek government, using local labour in addition to the 30 original leading hands supplied from the UK by the company. 

The ladies enjoy a day beside the seaside watching the second KEA-produced Blackburn Velos, T.12, being hauled into Phaleron Bay in April 1926. Only one of the photographs bears a caption on the reverse; it is signed by "Wallace", presumably the Blackburn employee who took the photographs.





ABOVE The Blackburn Velos was a two-seat development of the company's Dart torpedo-bomber, and was designed by Maj F.A. Bumpus in 1925 to a Greek naval requirement for a coastal-defence aircraft. Although the Velos was designed from the outset as a seaplane, the first of the Greek-produced examples, T.11, was fitted with a wheeled undercarriage and made its first flight from a rough airstrip behind the KEA factory on March 17, 1926. Interestingly, the floats on this example, seen at the KEA factory without its engine cowling, bear the marking T.11, suggesting that this is the first of the Greek machines after it had been fitted with a float undercarriage.



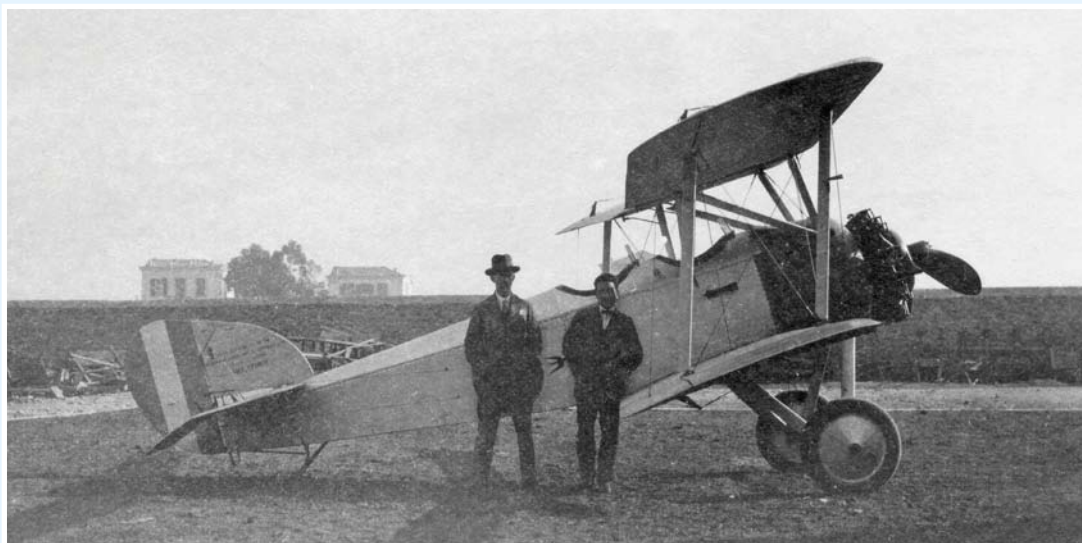
ABOVE The second product of the KEA factory was float-equipped T.12, seen here being manhandled from the factory to the shore of Phaleron Bay. Another ten examples of the Velos were built by the KEA for the Greek Navy, making a total of 12, in addition to four built in Britain. Note the distinctive maw of the Napier Lion installation.



ABOVE Although it has been written that T.12 made its maiden flight from Phaleron Bay on March 31, 1926, piloted by Col The Master of Sempill, the caption on the back of this photograph reads: "The 2nd Greek machine, Seaplane Torpedo Carrier, 5min before her first flight, Wed April 7, outside our factory". The launch was not easy, there being no slipway, so the aircraft had to be launched from the beach by an inexperienced handling party. The Greek-built examples differed from those built in Britain in having built-up rear cockpits to raise the Scarff ring for the gun. Two were fitted with dual controls for use as trainers, and several were still in service as late as 1934.



ABOVE The next step for the KEA was to produce an entirely indigenous Greek aeroplane. Named the Chelidon (Swallow), it was a small spruce-and-plywood fabric-covered open-cockpit two-seat biplane trainer and survey aeroplane of 26ft 3in (8m) span, powered by a nine-cylinder 130 h.p. Salmson air-cooled radial engine.



ABOVE & RIGHT All of the design and construction of the Chelidon was undertaken by the Greeks, under the supervision of Maj F.C. Buck and Mr Charles Herbert Lowe-Wylde. Only eight weeks after drawings were started, the aircraft was ready to fly. Taxying trials began on February 5, 1927, "straights" followed on the 9th and a circuit was flown on the 20th. During the ensuing three months of testing, it proved disappointing and it is believed that it was scrapped in 1938. A Greek navy order of late 1926 for 18 Chelidons was cancelled.



ABOVE A Greek enigma; while Lowe-Wylde was in Greece he commissioned Blackburn to build an aeroplane for him, and this diminutive single-seat single-bay biplane of approximately 21ft (6.4m)-span may have been the result. Its identity remains uncertain as it bears no markings, the Greek civil register not beginning until 1934.

At the end of the First World War Greece took delivery of 42 Airco (de Havilland) D.H.9 bombers, powered by 230 h.p. BHP engines, which were used mainly by the naval air force during the Asia Minor campaign and were subsequently transferred to Tatoi airfield and the Phaleron naval base. The KEA reconitioned a number of these and at least six were modified into seaplanes in 1926, the first such machine being N.A.97. The pristine reconitioned D.H.9 with its new float undercarriage seen here is N.A. 101, which was test-flown from Phaleron Bay in May 1927. Beside the D.H.9 is the sporting biplane possibly built for Lowe-Wylde. Similar in size and configuration to the later Currie Wot, it has a closely-cowled horizontally-opposed two-cylinder air-cooled engine, which turned an extremely small two-bladed wooden propeller. The wings are unstaggered, with full-span ailerons on the lower wing only. Any further info on this machine to the Editor, please!



***SEND IN* THE HEAVY MOB!**

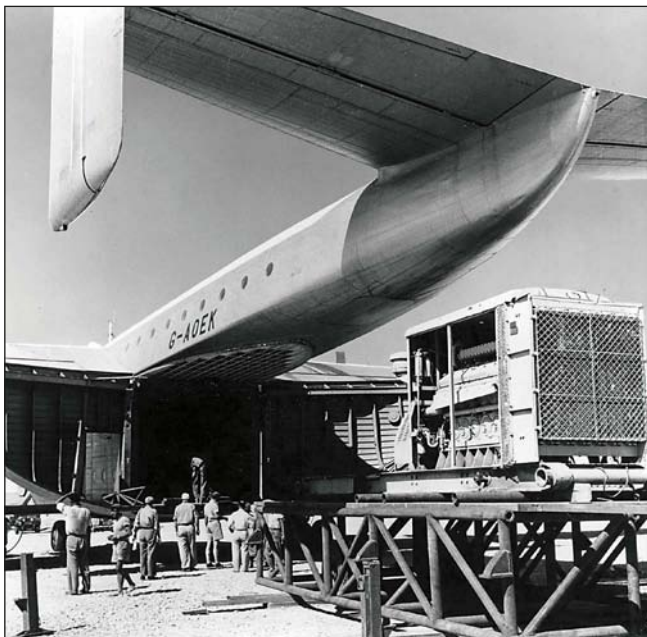
The Umm Said – Fahud Airlift, November 1955



MAIN PICTURE *Blackburn Universal G-AOEk at the test well site at Fahud, Oman, in November 1955. Having been unloaded at the primitive airstrip, the massive freighter is towed away from the loading ramp with a tractor.*

RIGHT *A Paxman diesel engine is prepared for loading aboard the Universal at Umm Said, before its 365-mile (587km) flight across the desert to Fahud. Four Paxman engines, their weights varying from 8¼ to 10 tons (8,385–10,160kg), were transported during the Umm Said–Fahud Airlift.*

PHOTOGRAPHS VIA STEPHEN GREENSTEDT UNLESS OTHERWISE STATED

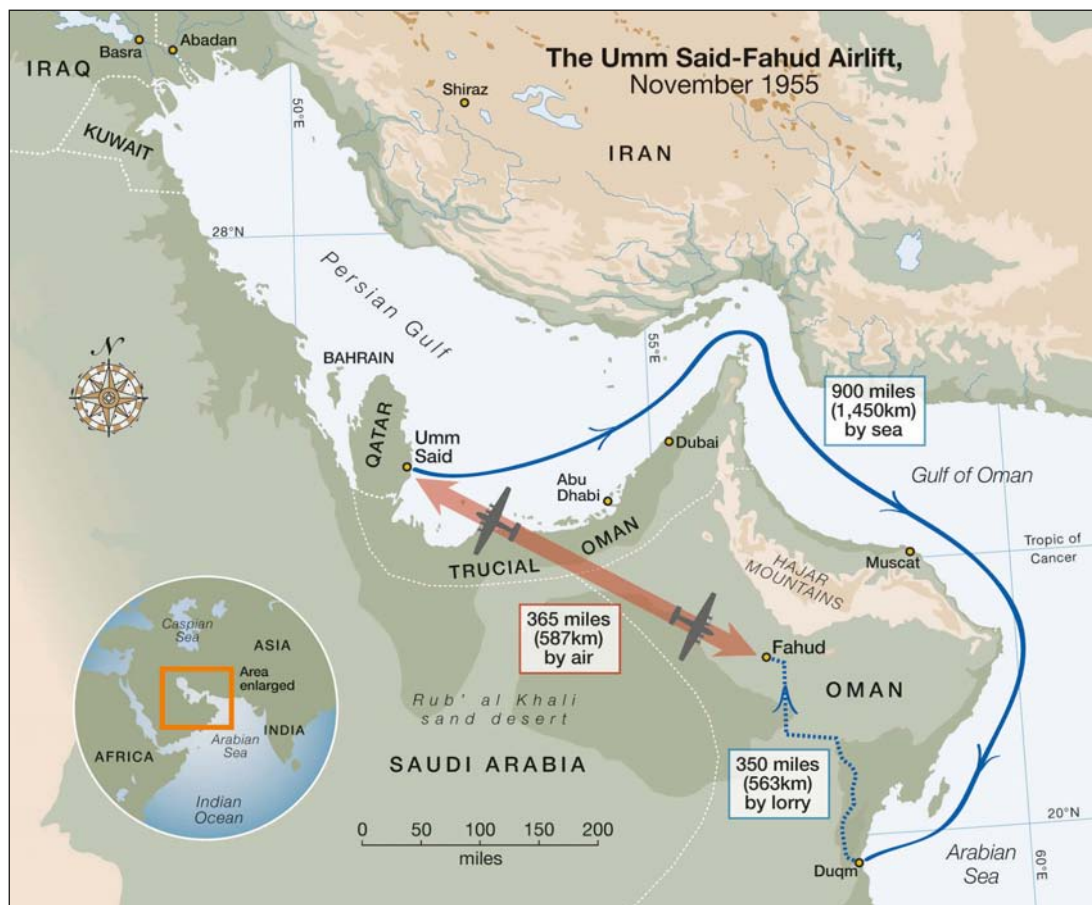


*What do you do when you have hundreds of tons of oil-drilling equipment that needs delivering to a primitive settlement accessible only via a barely-navigable 350-mile track through the inhospitable Omani desert? Enlist the help of Blackburn's gargantuan Universal Freighter of course! Which is exactly what the Iraq Petroleum Company did in November 1955, as **NICK STROUD** explains . . .*

IN THE AUTUMN of 1955 the Iraq Petroleum Company (IPC) had a problem. The British-based non-profit oil consortium had established a claim for oil rights in the remote desert territories of the Sultanate of Oman, on the south-west coast of the Arabian Peninsula, in the late 1930s, when the capricious Sultan, Said bin Taimur, had granted a 75-year concession to IPC. Although geological surveys undertaken in 1925 had found scant evidence of oil in Oman, promising hydrocarbon exploration in neighbouring Saudi Arabia 12 years later reactivated the company's interest in the area, and a subsidiary of IPC, Petroleum Development (Oman & Dhofar) Ltd, had continued to consider establishing an oilfield at a site near Jebel Fahud (Leopard Mountain) in the middle of Oman's central plain. It was not until October 1954, however, that the IPC subsidiary began surveying the area in earnest. Finding encouraging results, the company decided to have the courage of its convictions and construct a test well. Enter the problem.

Located in the flat, desolate central plain of Oman, Fahud was cut off from the north-east by the Hajar Mountains and





from the west by the formidable desert, both of which formed an effective barrier to overland transport. Meanwhile, tribal conflicts to the north made the nearest ports of Abu Dhabi and Dubai inaccessible.

The only practicable approach to the untapped potentially rich oilfields at Fahud appeared to be from the port at Duqm, 350 miles to the south, which would involve an arduous desert crossing using a caravan of specially-designed vehicles to carry the heavy drilling equipment required to construct the test well. Before this daunting journey could be undertaken, however, the equipment would have to be ferried south from Umm Said (now also known as Mesaieed), in the British protectorate of Qatar, to Duqm, a sea journey of some 900 miles (1,450km).

The challenges did not end there. At Duqm there was no deep-water harbour, necessitating the use of shallow-draught landing craft, through heavy surf, to land the specialist oil equipment, including 7½-ton diesel engines and a 21ft-long mud tank, on the far-from-ideal sandy beach. The combination of the beach landings and the subsequent desert crossing maximised the risk of damage, which in turn would add substantially to the overall cost of the

operation. There had to be an easier solution to the problem of transporting an entire oil camp to the middle of the desert . . .

A UNIVERSAL SOLUTION

Since its first flight on June 20, 1950, the Blackburn & General Aircraft Universal Freighter had caused gasps of amazement wherever it went — its cavernous main hold, some 36ft (11m) long, 10ft (3m) wide and 15ft 6in (4.75m) high, being capable of carrying loads hitherto undreamed of. Designed by General Aircraft Ltd's F.F. Crocombe and his assistant C.W. Prower as part of a post-war study into the next generation of British transport aircraft, the Universal Freighter was conceived as a simple four-engined high-wing unpressurised transport aircraft with a rugged fixed undercarriage for operating from the most primitive of airstrips, able to airlift a remarkable tonnage of military or industrial equipment.

Following a number of modifications to the type, which included the replacement of the prototype's Bristol Hercules 761 engines with four of the same company's Centaurus 18-cylinder sleeve-valve powerplants, the incorporation of a new four-wheeled main bogie



A characteristically splendid study of the first three production Beverleys in line astern taken by master aviation photographer Charles E. Brown. Bryan Greensted, chief pilot of the Hunting-Clan team during the 1955 airlift in Oman, later wrote that "they almost made it look elegant, but it was nevertheless like flying a block of flats!"

TAH ARCHIVE

undercarriage units, a new tailboom with seating for 36 passengers and clamshell rear-loading doors, the Universal entered production for RAF service as the Beverley C Mk 1, which would enter service in March 1956 with No 47 Sqn.

Although the mammoth transport, second only in size to Bristol's gargantuan Brabazon airliner, had been intended for use by civil operators as well as military air arms, no airlines bought it, despite Blackburn displaying a cutaway model of a cross-Channel car- and passenger-carrying variant, designed specially for Silver City Airways, at the SBAC Show at Farnborough in 1952. It was assumed that Silver City would place an order for the Universal, but Blackburn would not be able to supply any before 1955 and the airline needed replacements for its fleet of weary Bristol Freighters rather sooner. The airline investigated the French Breguet Deux-Ponts instead, ultimately leasing one example, F-BASL, in 1953.

The first two production Beverley C Mk 1s, XB259 and XB260, were allocated British civil registrations G-AOAI and G-AOEk respectively, and were initially retained by Blackburn for demonstration work on their completion in 1955. With Blackburn keen to prove the impressive

lifting power of its new as-yet-untested transport, and the logistics experts at Petroleum Development scratching their heads as how best to move nearly 130 tons of outsize equipment to an inhospitable outpost in the desert, the scene was set for a mutually beneficial opportunity for both parties to achieve their desired objectives. After exploratory meetings with Petroleum Development, Blackburn undertook to move the equipment and issued a statement explaining why the Universal (as it continued to call the aircraft in civil use) was the only game in town:

"The air distance between Umm Said and Fahud is 365 miles, so that air transport involves a simple flight of about two hours. From the very beginning of operations in the Fahud area the oil company has used air transport for urgent and valuable equipment, and for personnel. About 1,000 tons of equipment have been moved in by air and there have been about 2,000 passenger flight journeys in and out of Fahud".

A semi-prepared airstrip had been carved out at Fahud by Petroleum Development, and Bristol Freighters and Douglas Dakotas had made regular flights in and out since early 1955. The statement continued:

"The aircraft used up to now have a limited



LEFT *The Hunting-Clan team, led by Capt Bryan Greensted (second from left), with Blackburn test pilot Dick Chandler (furthest left) at Brough for training and familiarisation on the Universal. While chief test pilot for Rotol in 1943, Greensted had done much developmental flying for another of Blackburn's products, the Firebrand, testing reversible props. He later explained: "These tests came to an abrupt end when the propeller inadvertently went into reverse on approach to Staverton. It was truly spectacular — everything flew to pieces and I was left, sitting strapped into my seat, on the runway while the aircraft disintegrated around me. Further tests were abandoned — and not a moment too soon!"*

hold size and payload, and are unable to carry that equipment which cannot be broken down into small units. The only aircraft capable of carrying these large indivisible loads is the Universal". The negotiations between the two companies were concluded swiftly and plans put in train with immediate effect.

A JOINT VENTURE

To fulfil the flight operations, Blackburn turned to experienced British independent commercial aviation company Hunting-Clan, which was at the height of its Safari Service scheduled operations to Africa (see *A Flying Safari* in *TAH6*), and which boasted vast experience in terms of aircrew and organisational expertise. Representatives of Blackburn, Bristol and de Havilland would also accompany the big freighter on its

Arabian adventure, de Havilland being responsible for the Bristol engines' Hydromatic reversible-pitch propellers.

Leading the 12-strong Hunting-Clan team was the company's chief pilot, Capt L.B. Greensted MBE, a highly experienced airman who had established his reputation as one of Britain's finest test pilots during his wartime tenure at propeller company Rotol. Greensted had been at the controls of the sleek Martin-Baker M.B.5 for its first flight on May 23, 1944, and flew the greatest number of civilian sorties during the Berlin Airlift while chief pilot with Skyways, which he had joined in 1946. In overall command of the operation of the Universal was Blackburn's Gp Capt R.C. Hockey DSO DFC, whose distinguished wartime career had included flying clandestine flights to Nazi-

The Universal taxis into position for take-off at Umm Said. With its shack and somewhat basic control tower, the Qatari airstrip was positively metropolitan in comparison with the primitive facilities at Fahud at the other end of the airlift.





LEFT A view from the cockpit of the Bristol Centaurus engines being run up before departure from Fahud. The second production example, G-AOEk was fitted with Bristol Centaurus 173 sleeve-valve engines, which drove de Havilland hollow-steel-bladed propellers of 16ft 6in (5m) diameter, the largest then in use on a British aircraft. A direct-injection version of the Centaurus was proposed and tested for use on the Beverley, but the idea was never adopted.

Blackburn **AIRCRAFT**

BELOW With the clam-shell rear doors opened wide, the Universal takes aboard the heaviest load of the airlift, draw-works weighing some 16½ tons (16,765kg), at Umm Said. The makeshift ramp had been fabricated on site from locally available drill pipe; another was constructed and flown to Fahud for unloading.





ABOVE The rear half of the draw-works, weighing some 12 tons (12,200kg), is positioned on the makeshift ramp in preparation for its loading into the Universal at Umm Said. The tractor to the right was fitted with a winch, which, in combination with a pulley attached to the floor of the aircraft, was used for drawing the loads into the hold.



ABOVE The rear half of the draw-works is manhandled on to the pallets on the floor of the Universal. A November 1955 editorial in *The Aeroplane* magazine stated: "That Blackburn and Hunting-Clan have been able to bring off this operation between them is a matter for commendation by all who have the welfare of British aviation at heart".



ABOVE LEFT Bryan Greensted (left) and Gp Capt R.C. Hockey at Brough. Hockey represented Blackburn and was in overall command of the aviation aspects of the expedition. **ABOVE RIGHT** One of the Emir of Qatar's 11 sons (third from right) visited the Universal at Umm Said. Ron Hockey (with camera) is rapidly wilting in the desert heat.

occupied Europe with No 138 (Special Duties) Sqn for the Special Operations Executive. Also representing Blackburn would be company test pilot Dick Chandler.

With the contracts drawn up and paperwork complete, the Hunting-Clan team made its way to the Blackburn factory at Brough in Yorkshire for familiarisation with the massive transport, which had been issued with a special short-term civil Certificate of Airworthiness, valid for four months, on September 22, 1955. With Harold "Tim" Wood, Blackburn's chief test pilot (who had made the first flight of the prototype) in command, Bryan Greensted made his first 2hr training flight in the Universal's right-hand seat on October 24, making local flights to the former wartime airfields at Holme-on-Spalding-Moor

and Lindholme with Dick Chandler the following day, and with Blackburn test pilot G.R.I. "Sailor" Parker on the 27th.

INTO ARABIA

On October 31 Greensted took the left-hand seat for the first time for the 1hr 45min flight from Brough to Lyneham, from where the Universal would depart for Qatar. Finished in what was essentially the RAF bare-metal scheme with the upper fuselage and boom painted white and a black anti-glare nose panel, G-AOEK — dubbed "Oh 'Eck!" by the crew — had the legend "Blackburn Universal" applied below the cockpit above the crew entry door.

On November 1, 1955, Bryan Greensted lifted the Universal off the runway at Lyneham on the

The Universal thunders down the airstrip at Umm Said with the inevitable ensuing sandstorm. The airlift went a long way to establishing the big freighter not only as a very capable heavy-lifter, but one that could operate from the roughest of rough strips and in hot conditions.



first leg of the 3,200-mile (5,170km) flight to Umm Said in Qatar. The flight routed through Tunis and Beirut and after 22hr 15min flying time the slow-but-sure Universal landed at the well-established oil port at Umm Said on the Qatari south-eastern coast on November 3.

Although several sources, including Blackburn's own press statements, claim that the first of the Universal flights between Umm Said and Fahud was made on November 4, it was in fact two days later that Greensted made the first of the equipment delivery flights to Fahud, which was little more than a levelled strip of desert approximately 3,000ft (900m) long. The round trip from Umm Said to Fahud and back to Umm Said took 4hr 40min, considerably less time than the gruelling slog across the desert to the south in prospect otherwise.

HOT WORK

Over the next three days the Universal made a trip a day, carrying oil-pipe-lifting machinery, Paxman diesel engines, draw-works equipment and other vital items for the test well, each flight taking a little more than 2hr each way. The Universal and its crew were given a 48hr rest on November 11–12, flights resuming on the 13th. With temperatures at Fahud reaching 40°C in November, the unloading work at the sun-bleached strip was punishing, and the British contingent found the heat somewhat oppressive.

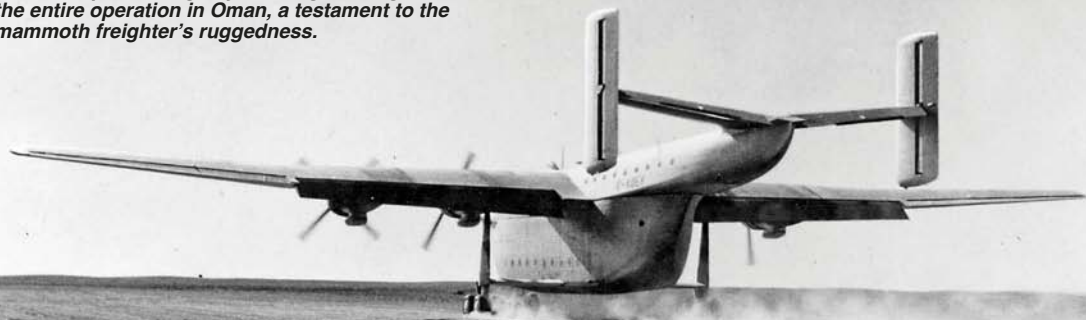
Each flight from Umm Said would start with a

section over the Persian Gulf before passing over the coast west of Abu Dhabi, where more than 250 miles of the *Rub' al Khali* — the Empty Quarter — the world's largest sand desert, stood between the coast and Fahud. The feldspar dunes and sheer remoteness of the region made emergency landings an impossibility. Stephen Greensted, Bryan's son, gives an insight into why his father may have been selected for the Arabian operation:

"During the Berlin Airlift my father acquired the nickname 'Press On Regardless' owing to his willingness to fly in bad weather using a stopwatch to time when to turn and when to land when flying in muck. It was not a term of affection — his crews were frequently terrified. The Umm Said mission was a classic 'Press On Regardless' undertaking, as he and the crew were fully aware that if one engine failed they would face an emergency landing. I suspect that he got the job *because* he was 'Press On Regardless', rather than in spite of it".

Thankfully the Universal behaved impeccably and demonstrated its hefty freighting capabilities with aplomb, a total of eight return flights being completed during November 6–16. The last day saw the heaviest lift, when draw-works equipment weighing 16½ tons and measuring 21ft x 9ft x 8½ft (6.4m x 2.75m x 2.6m) was carried. On November 17 the Universal was packed up for the flight back to the UK via Baghdad, Beirut, Nicosia and Rome, the team

The runway conditions at Fahud were considerably worse than those at Umm Said, but the Universal did not require a single tyre change throughout the entire operation in Oman, a testament to the mammoth freighter's ruggedness.





ABOVE Back home — the *Universal* after its return to Heathrow on November 21, 1955. Bryan Greensted is third from left, Ron Hockey is in pale overalls and Blackburn's Dick Chandler is second from right. Note the Arabic legend, which translates as "Try Your Strength", applied to the *Universal*'s nose after completion of the airlift.

arriving at Heathrow on November 21 after 18hr 55min flying time. After the completion of the Airlift, but before returning to the UK, Arabic writing was applied below the "Blackburn Universal" legend, bearing the phrase "Try Your Strength: The Blackburn Beverley".

It had been a public-relations triumph for Blackburn, its inelegant but extremely effective workhorse having transported some 129 tons of outsize equipment over some of the most forbidding territory in the world, with only minor maintenance being required for the aircraft and its Bristol powerplants.

THE AFTERMATH

In January 1956 Petroleum Development began drilling the first test well at Fahud, but found it dry. Further test wells were built, but these were also found to be dry and it appeared that the original 1925 survey may have been right. The lack of success at Fahud, added to a glut of oil on the world market in the late 1950s, led most of the company's partners to withdraw from the venture in 1960, only Shell and Partex opting to remain in Oman to continue searching for oil. It

seemed that the *Universal*'s efforts had been in vain. In 1963, however, oil was struck only a few hundred feet from the original test well at Fahud and the area continues to be profitable today.

On its return to the UK the *Universal* reverted to its military serial, XB260, and was used for a 500hr intensive-flying programme, before going to Canada in March 1957 for winterisation trials. It later served as a Beverley with the RAF's Nos 47, 53 and 34 Sqns, as well as the Far East Training Flight, before being scrapped at Seletar, Singapore, in February 1968.

The Fahud Airlift was instrumental in establishing the big freighter's credentials as a world-class heavy-lift aircraft, even if it led to no commercial orders for the type. As *Flight* reported in its November 25, 1955, issue: "There is no doubt about the military significance of such haulage work, and we recall the words spoken two weeks ago by Marshal of the Royal Air Force Sir John Slessor — 'We have got to have a highly mobile reserve of land forces ready to move from A to B with their bulky equipment as quickly as possible, which in my view is another way of saying Beverley!'"





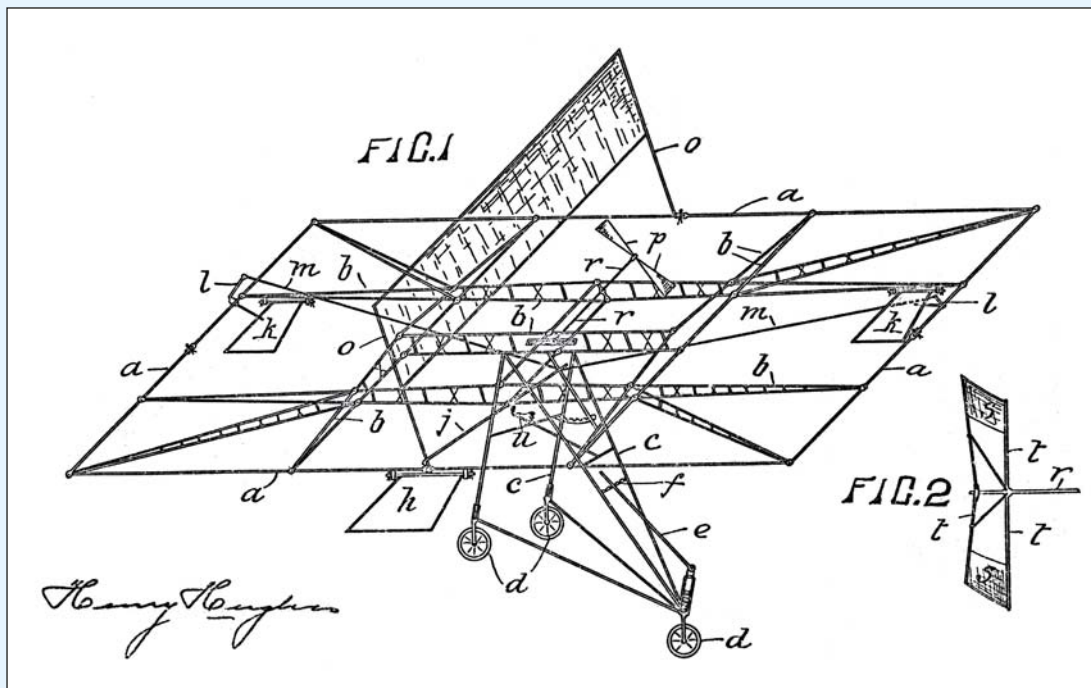
New Zealander Richard Pearse said he never flew, while others claim that he beat the Wright brothers into the air — so who is right? New Zealand-based aviation historian **ERROL MARTYN** examines contemporary interviews with Pearse himself, conducted by local newspaper reporters in 1909, in which the charming 31-year-old is surprisingly candid about exactly how far he got with the flying-machine he built in his Waitohi farmhouse

RICHARD PEARSE: THE FINAL WORD

UNDoubtedly, although through no fault of his own, the most controversial figure in New Zealand's aviation history over the last 50 years has been Richard William Pearse (seen in a 1903 studio portrait **ABOVE**). The controversy arises from claims that Pearse not only made the first powered flight or take-off in New Zealand, but that he also did so before the Wright brothers' historic flights of December 17, 1903.

To the fore, in particular, have been the works of New Zealand authors Gordon Ogilvie (*The Riddle of Richard Pearse*) and the late Geoffrey

Rodcliffe (*Richard Pearse; Wings Over Waitohi; Flight over Waitohi and Richard Pearse and his Flying Machines*). The Rodcliffe books and booklets appeared in various editions between 1978 and 2007, and Ogilvie's book in four editions between 1937 and 2003. Ogilvie finally admitted in a November 2011 article in a Christchurch newspaper (*The Press*) that Pearse could not have flown or taken off before 1904. (Ironically, the admission came about as a result of documents that indirectly came to his attention through this writer's research.) Unfortunately, the printed word, especially in



ABOVE The only known depiction of Pearse's aeroplane, from the 1907 version of his patent. Rather confusing at first glance, it shows the wing as viewed from beneath from a three-quarter-front position, while the undercarriage frame has been swung down so that its framework does not interfere with the details of the wing structure.

book form, is long-lasting and the incorrect claims made in these works have found their way into a myriad of official and unofficial sources, although Pearse himself clearly stated in two letters to newspapers in 1915 and 1928 that he only started on his quest to solve the problem of powered flight in early 1904. Promoters of a 1903 (or even 1902) take-off or flight by the Waitohi-based inventor, blinded by parochialism or nationalistic fervour, have unwisely ignored these statements and allowed themselves to be misled by unreliable memories (especially as regards dates) gathered 50 or more years after the alleged event.

This blind pursuit of a pre-1904 flight or take-off by Pearse led to significant late 1909 reports of Pearse's aeroplane being casually dismissed by many as merely a development of an earlier machine. Rodliffe went even further, making a fictitious claim that they concerned a second and completely different design altogether. Had these 1909 reports rung alarm bells and been diligently followed up by the authors at the time, not only would the full nature of Pearse's impractical flying machine and his attempts at flight have come to light, but also a charming insight into the character of the man himself.

What the papers said

When researching the first volume of my book, *A Passion For Flight: New Zealand Aviation before the Great War: Volume 1 — Ideas, First Flight Attempts*

and the *Aeronauts 1868–1909* (Volplane Press, Christchurch, New Zealand, 2012), I considered it necessary to examine all local-area newspapers published during late 1909 and early 1910, several titles of which had clearly been overlooked by previous researchers. [See *Armchair Aviation* on pages 120–124 of this issue for a review of subsequent volumes of the author's history of early aviation in New Zealand — Ed.]

One of these was the *Timaru Post*, which reported on urban and rural matters. The newspaper ceased publication in 1939 but copies are still available for viewing at the South Canterbury Museum at Timaru. On November 16, 1909, a reporter from the *Timaru Post* made his way to the Pearse property to inspect the aeroplane and interview its inventor at his workshop. His account, comprising a column and a half, appeared in the next day's issue.

Prominently headlined "After five years — A New Zealand machine completed — Mr Richard Pearse of Waitohi the inventor", not only does the article feature the earliest known description of the aeroplane Pearse actually constructed (as opposed to his 1906–07 patented concept or the Rodliffe-inspired fictitious modern replicas), it also quotes verbatim an interview with the 31-year-old inventor. Here Pearse's own words prove conclusively that he had not even begun construction of — let alone attempted to fly — a powered aeroplane before the Wright brothers.

On arrival at the property the reporter was



LEFT In 1958 some remains of Pearse's aircraft were discovered in a riverbed in Opihi by Maurice Cameron. Well-known New Zealand pilot and engineer George Bolt stands beside a two-bladed metal propeller and the remains of a horizontally-opposed four-cylinder engine from Pearse's first aeroplane. **ABOVE** The remains of the engine, which had no crankcase and therefore operated on a total-loss lubrication system.

OPPOSITE PAGE One of a number of so-called "replicas" of Pearse's first aeroplane. Based on the 1907 patent drawing — not a plan — it bears little resemblance to the considerably larger machine that Pearse built and attempted to fly during 1909–10.

warmly welcomed by the young inventor:

"Without further ado [I] reached the field and the hut . . . and, accompanied by a yelping cur which made its appearance from beneath a dray in the centre of the field, I crossed the field and rapped at the door of the dilapidated old structure. 'Come in', said a cheery voice. I entered. The impression made upon my mind is one that I know will never be effaced. To the right of me was an empty room resembling a miniature barn, littered with sacks and chaff. In the passage, immediately in front of me, rested three pieces of mechanism, built of bamboo poles and nails, for all the world resembling the spars and sails of a yacht.

"To the left of me, however, was 'the room'. It was only with the utmost difficulty that I was able to bear in mind that I was nine miles away from what townsmen call civilisation. Here in the open field, two miles away from the nearest dwelling, I was face to face with the replica of an up-to-date engineering establishment. There stood the forcing-furnace [sic], the time-honoured lathe, bits, bores and innumerable other tools.

"The litter of scrap-iron, tins, oils, wire, inseparable from an engineering establishment, was there; and in the midst of it all, king of his own little den, stood the inventive genius himself, Richard Pearse — the man who, day in and day out, from eight o'clock in the morning until six o'clock in the evening, for five long, weary years . . . has plodded on . . .

"The man is an enthusiast, heart and soul. He is as fresh, as happy, as healthy and as deter-

mined as the day, when, five years ago, he set out to achieve the dream of his life — the inventing and making of a flying-machine. And has he succeeded? Well, it would appear so.

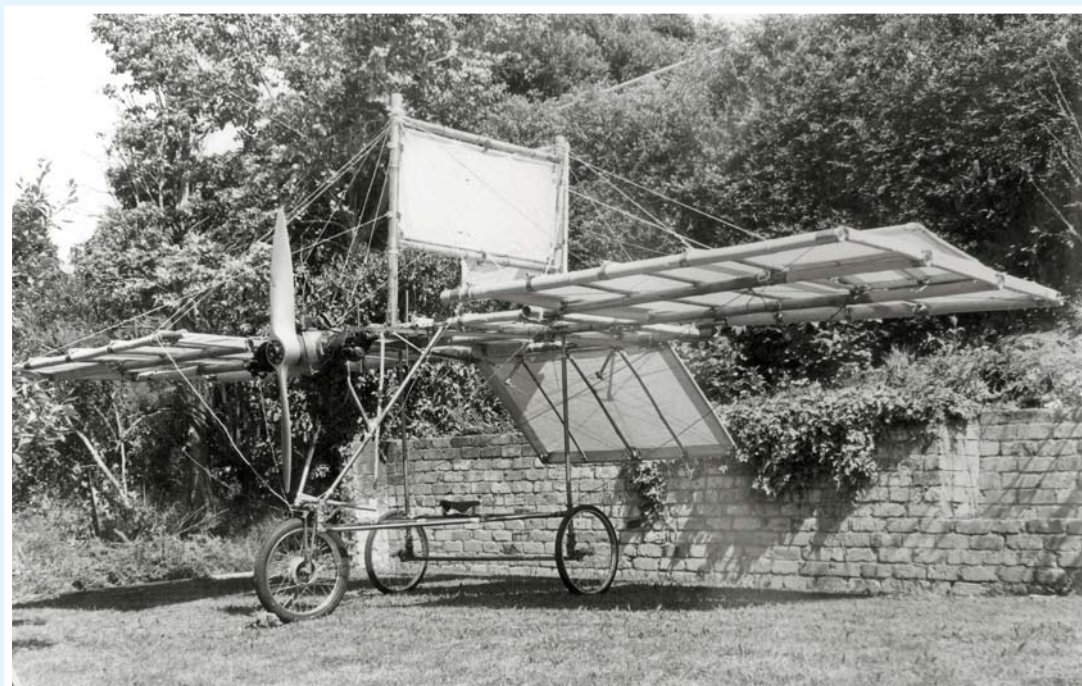
"The beautiful network of machinery, bamboo, wire, and tarpaulin — looking for all the world like a large spider's web, with a fly in the centre, and wings at the rear and at either side — answers affirmatively. From the equilibrium rudders at the sides and the guiding rudder at the tail to the propeller at the front, and the engine in the centre, the machine is entirely original and demonstrates clearly the untiring patience, indomitable pluck and engineering skill of the inventor."

As Pearse was often in the habit of describing all of his control surfaces simply as "rudders", it is not always clear as to what was being referred to. Those at the "sides" were probably his patented steering "vaness" or perhaps, by this time, actual ailerons, while that at the tail could have been an elevator or rudder (although *The Otago Witness's* Sam Carter, who also called on Pearse soon afterwards, stated that "no vertical rudder is to be seen"). It is highly probable that Pearse would have revised some of his 1906–07 patent ideas (the drawings of which differ significantly from what was actually built) as a result of new information coming to hand over the intervening years.

Pearse speaks

Clearly taken with Pearse the man, the reporter persuaded him to tell his own story:

"Perhaps it would be as well to tell Richard



Pearse's tale in his own words. For the information of those who have not had the privilege of meeting this silent worker on the plains, I might mention that he is a man of both striking personality and appearance. He is of good physique, stands well over 6ft [2m] in his socks, and his hands are large and hardened as those of a man well used to the rough toil of life. His story is simply told, and put in connected form, reads as follows:

'I am the son of a farmer, and have two brothers, both of whom, and myself, are bachelors. My father is a retired man and lives with my mother at Temuka. His farm is cut up between myself and my brothers. The labour of my portion I lease, and I make sufficient from it to live comfortably and pursue my hobby.

'From the time I was quite a little chap, I had a great fancy for engineering, and when I was still quite a young man I conceived the idea of inventing a flying-machine. *I did not attempt anything practical with the idea until, in 1904* [author's italics], the St Louis Exposition authorities offered a prize of £20,000 [sic] to the man who invented and flew a flying-machine over a specified course. [The St Louis Exposition ran from April 30 to December 1, 1904.] I did not, as you know, succeed in winning the prize; neither did anyone else. But I succeeded sufficiently to realise that there was a future before the flying-machine and to send me on the course which is now within a week or two of complete success.

'Many of the parts of my machine have been used on the other side of the waters. I do not say, mind you, that my inventions have been copied;

Pearse's Aircraft No 1 data

NO ORIGINAL PLANS, drawings, photographs or detailed specifications of the aeroplane Pearse built have survived. A general impression of the machine may be gained from the following data drawn from the late 1909 newspaper reports of visits to Pearse at the time, and from letters he wrote to newspapers in 1915 and 1928

Powerplant

1 x 24–25 h.p. four-cylinder piston engine of 100–120lb (45–54kg). To be replaced by a 50 h.p. engine of around 110lb (50kg); Pearse states in his 1915 and 1928 letters that his final engine was capable of 60 h.p. and weighed 240lb (109kg)

Dimensions*

Span		
(oval-shaped wing)	34ft 0in	(10.36m)
Span/chord ratio	1.2:1	
Wing area	700–900ft ²	(65–84m ²)

Weights

With 25 h.p. engine		
Empty	340lb	(154kg)
All-up	500lb	(227kg) [†]

Estimated performance

Maximum speed		
with 25 h.p. engine	12 m.p.h.	(19km/h)
with 60 h.p. engine	20 m.p.h.	(32km/h)

* The size and shape of the elevator is unknown but it was moved from the rear to the front in November 1909

† Later Pearse claimed an all-up weight of "under 700lb" (318kg), presumably with a 60 h.p. engine



LEFT Pearce's only other aeroplane was his "utility aircraft" constructed at Christchurch during 1933–43. Now displayed at the Museum of Transport & Technology (MoTaT) in Auckland, it is seen here after its arrival at Auckland in November 1956, three years after Pearce's death. Its transport from Christchurch aboard a USAF Douglas Globemaster was the closest it ever got to making a flight.

OPPOSITE PAGE Another "replica" of Pearce's first aircraft, this one displayed at MoTaT. Again, this bears little resemblance to the original as described by Pearce, which had much greater wing area and significant differences in its control system.

it is but natural that different men working on the same ideas should arrive at the same conclusions. But, I will say that many of my inventions have come into use on the other side of the world since my own were patented in New Zealand. Almost every portion of my machine is of my own exclusive manufacture. The 25 h.p. petrol engine in four parts [Pearse is probably referring to cylinders here — Ed] and radiator are built by myself specially for a flying-machine. The lightest engine in the world, to my knowledge, weighs somewhere in the vicinity of 300lb [135kg]. My 25 h.p. water-cased engine weighs 100lb [45kg] only, turns the four-sheet steel propeller blades at the rate of 800 revolutions to the minute, and under the very severe tests to which I have subjected it, has never shown the slightest sign of failure. My propeller connects direct with the crankshaft, thus obviating the necessity for clutches or any other weighty gear’."

Pearse appears to have been somewhat out of touch with the latest technical achievements elsewhere. The 25 h.p. Anzani used by Blériot for his famous cross-Channel flight in July that year, for example, weighed about 145lb (65kg) and produced twice the r.p.m. of Pearce's engine. Even the 35 and 45 h.p. Anzani engines came in well under 300lb, at 176lb (80kg) and 231lb (105kg) respectively. In his 1928 letter to *The Christchurch Star* newspaper Pearce states that his first engine was of 24 h.p. and weighed 5lb (2.25kg) per h.p., i.e. 120lb (54kg) in total. Whether the engine was capable of a sustaining an output of 24–25 h.p., however, is open to question. The inventor continued:

"The whole secret of the flying-machine is in its lightness and sustaining power. My machine

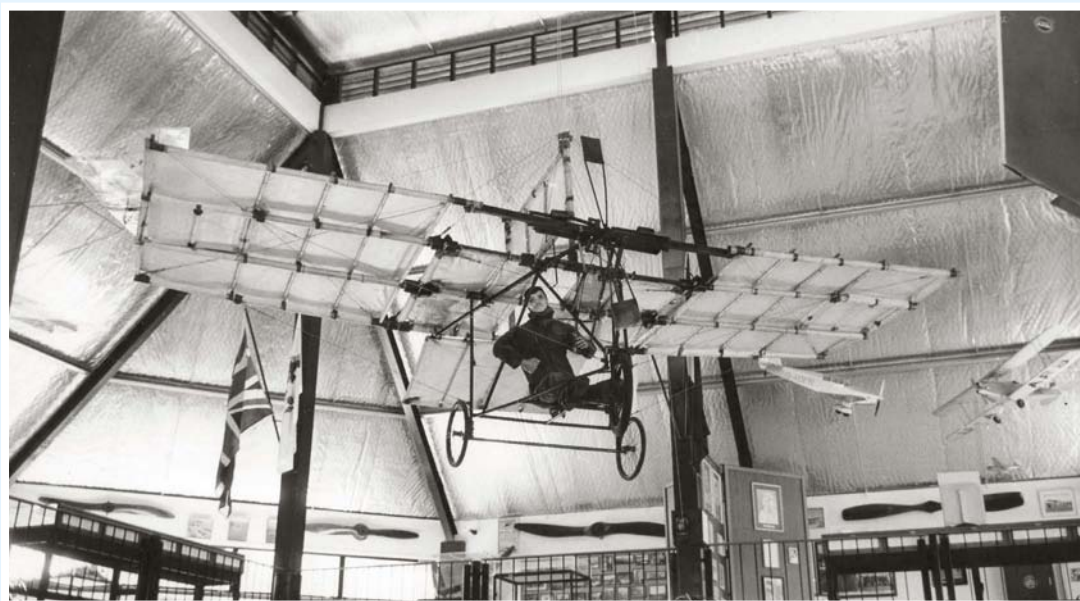
weighs altogether, with me in it, only 500lb [225kg], as against the 1,000lb [450kg] and 2,000lb [900kg] weights of the machines on the other side of the world. I have 900ft² [84m²] of sustaining area, as against 500ft² [46m²] and 700ft² [65m²], the sustaining areas of the 1,000lb and 2,000lb machines in the northern hemisphere.

"The action of the flying-machine is simply that the propeller drives the machine along, and like a boy with his kite, as soon as a certain velocity is attained — in the case of my machine, 12 m.p.h. [19km/h] — the machine is elevated with its tricycle [undercarriage/car] into the air, and sustained there by the sustaining 900ft² of canvas beneath the body of the machine. Would the machine drop instantly if the propeller stopped revolving? Certainly not; the machine would descend as gracefully as a parachute.

"At the present moment my rear rudder [Pearse may be referring to a form of elevator here — Ed] is slightly too heavy for the rear of the machine, and I am shifting it to the front, when every piece of the working mechanism will be within my sight as I sit in the machine. I have had several tests. Last week's [November 8–13, 1909] was my most successful one, the machine rising readily, but tilting gradually at the rear owing to the rudder [elevator?] in that position disturbing the equilibrium."

Revealing remarks

Pearse's kite and parachute analogies are revealing. It helps explain why he never solved the problem of control or achieved practical flight. As later confirmed by Sam Carter, there was no camber on the wing. With its vast and lightly-loaded wing, Pearse had in effect built himself what amounted to a large motorised



kite. He evidently believed that lift came from the pressure of air beneath the wing, failing to understand the need for an aerofoil section to induce the appropriate airflow. As the machine moved forward, the wind striking the wing's undersurface would naturally cause it to rear up, or "tilt", and lead to a rapid loss of control.

Unless it was especially well-braced, the large wing would also tend to distort as it took the load. This may partly explain the common eyewitness recollection many decades later of at least one flight attempt coming to an abrupt end on the top of a tall overgrown gorse hedge.

Pearse appears to have been so heavily focused on the long and difficult business of developing his engine — he built three, possibly five, going through at least seven factory-made crankshafts in the process — that he simply deluded himself about, or failed to pay sufficient attention to, the literature then available setting out the significance of a wing's aerofoil shape and the importance of control surfaces.

Still extremely naïve about the impractical nature of his machine, Pearse then proceeded to outline for the reporter the ambitious plans he had in mind for the immediate future. He had also constructed, or was constructing, a more powerful engine:

"As you may imagine, after five years' labour without a return, and the expenditure of about £300 in raw material, I cannot afford to take any risks with my machine. Next week, if my trial is satisfactory, I will make preparations for the giving of public exhibitions. The whole of the parts of my machine are held together with steel pins, and can be taken to pieces and packed with very little trouble. There is no commercial value in a flying-machine itself at present.

"If I can get my machine right for flying exhibitions throughout Australasia, within a short time, my fortune is made. If through any cause I am delayed, and foreign machines are exhibited here, I will simply get no return; but that will not prevent me bringing my machine to perfection. I am now getting 800 r.p.m. out of my propeller, and, if necessary, I am prepared to put into it an invention I have just completed and am patenting — a 50 h.p. petrol engine weighing a little over 100lb. The engine itself will be unique in the scientific world, but if I have to resort to it, it will delay the exhibiting of my machine for another three or four months. But I hope to do without the new engine and be in a position to give exhibition flights on my machine in the course of two or three weeks."

The machine in action

The *Timaru Post* representative was then offered a demonstration:

"Would you like to see the petrol engine and propeller in operation?" I admitted I would, and my desire was promptly gratified. The engine was set going, the propeller was given a twist or two, and with a suddenness wholly unprovided for, I was almost blown off my feet by a veritable hurricane of wind. The propeller blades spun round until they appeared as mere shadows in the daylight; the machine heaved and rattled like a living thing, seeming every moment as if it would spring from the north and disappear. The smile of supreme contentment that lit up the face of Richard Pearse as he watched the lifelike movements of this thing of his own creation was alone worth going to Waitohi to see. A touch of the hand, and the vibrating mechanism was as dead as a stone."

It was now well after 1700hr and the reporter realised that he had no chance of catching the 1818hr train back to Timaru. This was of no concern, however, for “after partaking of the lavish hospitality of the Pearse Brothers at their bachelor house, a couple of miles distant”, he set off “in a cheerful spirit” after his day of adventure to pedal the 15 miles to his Timaru home.

Confronting a first-flight myth

So when did Pearse first attempt to fly his first aeroplane? On the day the *Timaru Post*'s long article appeared, the *Tuapeka Times* published the following brief item:

“The inventor of an airship [sic], a farmer living near Temuka, made a trial flight with the ship a day or two ago. He took it on to a hill in a field of wheat and set the motor going, but the machine refused to use its wings in the desired way, and fluttered down the hill aimlessly.”

That a first trial flight was imminent had been announced elsewhere just a fortnight earlier, so the above event, sometime in November 1909, was either the first or one of the very first. Either way, it occurred long after the Wright brothers' famous exploits of December 17, 1903, and was a dismal performance that bears no comparison. Later, at the end of January 1910, it would be reported that Pearse had “made a number of successful flights [sic] of 200yd, 300yd and 400yd”. In reality, these would have been not flights but very low-level uncontrolled hops,

Pearse himself even affirming in a 1928 letter that he “never flew with it”.

Despite Pearse's persistence and resourcefulness, he was certainly not the genius or aviation pioneer that some have made him out to be. Nobody was influenced by his work, even if they knew of it, and, as confirmed by reporters who interviewed him and inspected his recently-completed machine in November 1909, it did not represent an aeronautical advance. Sadly, the same is also true of a second and equally unsuccessful aeroplane that he designed and constructed during the 1930s and 1940s.

The Pearse “first to fly” myth has primarily been driven by parochialism or nationalism, powerful passions that have led some to promote it vigorously, notwithstanding the facts as published in 1909 and the statement made by the man himself in that year that he did not commence practical work on his machine until 1904. It is tragic, though, that on completion of his schooling at Waitohi, Pearse was denied the opportunity to acquire the advanced technical training that might have enabled him to develop his intense interest in aeronautical engineering. Who knows what real contribution he might then have made to the progress of aviation?



ACKNOWLEDGMENTS

The author would like to thank Philip Jarrett and Robert Kerr for their invaluable assistance with the preparation of this feature



PHILIP JARRETT

ABOVE Yet another “replica” of the Pearse machine was transported to the UK in 2003 by the New Zealand branch of the Royal Aeronautical Society (RAeS), to be displayed at the RAeS Centennial Garden Party at Old Warden in July that year. Pearse's original machine would have been substantially larger, with far greater wing area.

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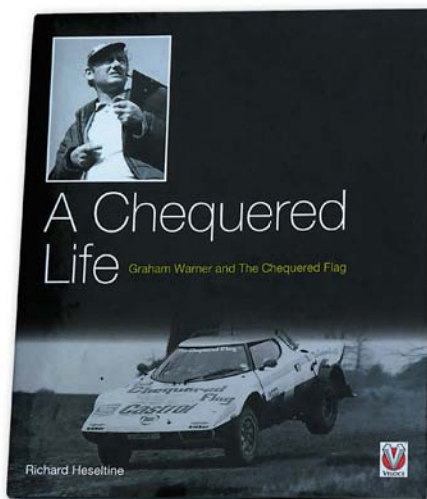
We take a look at what's available for the aviation history enthusiast in the world of books and other literature, from hot-off-the-press publications to reissued classics

A Chequered Life: Graham Warner and The Chequered Flag

By Richard Heseltine; Veloce Publishing, Veloce House, Parkway Farm Business Park, Middle Farm Way, Poundbury, Dorset DT1 3AR; 10in x 8½in (260 x 210mm); hardback; 160 pages, illustrated; £30. ISBN 978-1-845844-13-4

WHAT IS AN apparent motorsport biography doing in the pages of *The Aviation Historian*? Well, it's not just about the motorsport, as anyone who has been following aircraft-preservation developments over the past few decades will know. While Graham Warner [*who, sadly, died on March 8, 2014, just after this review was written* — Ed] made his very considerable mark on the world during the 1960s–80s with his racing team and Chiswick-based sports car dealership, both operating under the banner The Chequered Flag, he is revered in the aviation sphere for putting the Bristol Blenheim back on the map from the 1980s onwards. He did the latter by masterminding and financing two epic airworthy rebuilds and writing several books on the type.

Warner's career began not in motorsport but in flying, however, as an RAF pilot — so aviation neatly brackets his life, in a story told with great pace and precision by a leading motor-racing journalist and historian. While this review is written more from the aeronautical perspective, the motorsport elements which comprise some 70 per cent of the book will appeal to anyone who relishes speed, power, engineering or any combination thereof. Also, there is an inescapable parallel between land and air: the intense rollercoaster-ride of Warner's motoring career, with its stellar triumphs and crushing setbacks, was to be mirrored in the epic that is the



Blenheim restoration story.

Born in 1929, Warner had two elder brothers, one of whom was shot down and killed in 1943 while serving as an RAF bomb-aimer.

Warner nevertheless followed him into the Service, flying Meteors and Vampires, before returning to civvy street with an ambition to race cars. Financing this passion by entering the motor trade, he rapidly built a very successful sports car business and embarked on campaigns in many racing categories up to and including Formula One,

acting variously as driver and team principal as well as creating the classic Gemini. It was in the Gemini that Warner gave soon-to-be racing legend Jim Clark his maiden single-seat start; his other talent-spotting successes included Jacky Ickx, Graham Hill and Jackie Stewart. In the 1970s and early 1980s The Chequered Flag moved into rallying, with a line-up including the stunning Lancia Stratos.

Meanwhile, in 1978, a casual invitation from fellow racer Robs Lamplough, owner of some historic fighters at Duxford, led to Warner's first and fateful encounter with the late Ormond Haydon-Baillie's abandoned Bristol Blenheim/Bolingbroke restoration project. He took it on, returning a Blenheim to the air at last on May 22, 1987, after 12 years of effort — only to see it almost destroyed in an all-too-avoidable accident at Denham just one month later. With characteristic resilience and determination, Warner undertook to do it all over again — in just five years this time — and in May 1993 a Blenheim flew again.

That was not the end of the story, because in 2003 (not long after this reviewer enjoyed the great privilege of a flight in the turret) pilot error led to another crash, from which the aircraft is on

course to emerge to airworthiness once more, albeit no longer under Warner's ownership. Through all this, Warner was restoring the Blenheim to its rightful historical place not just in terms of hardware but in print as well, in a series of books culminating in the definitive *The Bristol Blenheim: A Complete History*, first published by Crécy in 2002.

Warner was charismatic but self-effacing, and much of this lively and well-illustrated book focuses more on his teams, his cars and his aeroplanes (and even a record label he once owned, involving blues giant Alexis Korner) than on the man himself; but without him, this remarkable story would not have happened.

MICK OAKLEY

Focke-Wulf Fw 200 with Danish Air Lines in War and Peace, 1938–1946

By Rob J.M. Mulder and Günther Ott; European Airlines, available via www.europeanairlines.no; 8½in x 12in (216mm x 300mm); hardback; 160 pages; illustrated; €24.95. ISBN 978-8-29973-717-3



TO WRITE A book focusing on just two individual aircraft may seem the ultimate in discrete topics [not quite! — see Peter B. Mersky's review of Chris Monier's book on one airframe in this section — Ed], but the authors have managed to produce an absorbing volume that deals with the history of two of these most elegant of pre-war airliners.

The book starts by giving the background to civil aviation in Denmark in the inter-war years, and the decision by *Det Danske Luftfartselskab* (DDL — Danish Air Lines) to procure modern equipment in the late 1930s. The technicalities of the Fw 200 are described, as are the record-setting flights by the various prototypes. There are also brief individual histories of the Fw 200s operated by Lufthansa.

The book then moves to the meat of the narrative, describing the delivery of the two Condors — OY-DAM *Dania* and OY-DEM *Jutlandia* — in 1938, moving on to their introduction into service and operations up to 1940. There follows a detailed history of the two aeroplanes, with *Dania* being stranded in

England in April 1940 when the Nazis occupied Denmark. It is quite clear that the British authorities and BOAC did not really know what to do with the aircraft, and one might well assume that they were relieved when *Dania* was written off in July 1941 following an accident at White Waltham! *Jutlandia*, on the other hand, had a much more successful career.

After the occupation of Denmark, DDL was given permission to operate a service from Copenhagen to Berlin. This was extended at

various times to Munich, Malmö in Sweden and Vienna in Austria. Operated at first by a Junkers Ju 52/3m, *Jutlandia* joined the service in August 1940. Throughout the remainder of the war DDL, in conjunction with Lufthansa, maintained these services with increasing difficulty as the Allies encroached from both west and east.

Following the liberation of Denmark, DDL immediately restarted operations in Scandinavia, and in September 1945 *Jutlandia* operated the first post-war service to London. The airline's fleet was expanded with the addition of Douglas DC-3s and converted Boeing B-17s. The management, appreciating that the

economics of operating a single Fw 200 did not make sense, attempted to secure abandoned former Luftwaffe Fw 200s. While two (AM96 and AM97) were eventually obtained, AM97 crashed on take-off when a DDL crew attempted to fly it from Schleswig to Copenhagen, and the cost of converting AM96 to airline standard proved prohibitive. *Jutlandia* continued in limited service until, in September 1946, it groundlooped after a crosswind landing at Northolt and broke its tailwheel. A repair was considered too expensive and the aircraft was written off.

The book has many good photographs of the two aircraft, both in the text and in a separate gallery (although the reproduction of some of these could have been better). These are complemented by a range of period DDL ephemera and timetables. There are also excellent colour side-view artworks by Juanita Franzi of both aircraft in all their several colour schemes. There is a short bibliography (mostly of the authors' other titles) and an index. The book would have

benefited from some maps setting out the routes flown by these aeroplanes. It has to be said that the text demonstrates that the authors are not native English speakers and would have been improved by further proofreading.

Notwithstanding these minor niggles, this title will justifiably appeal to those interested in civil aviation history and is well worth reading.

NIGEL DINGLEY

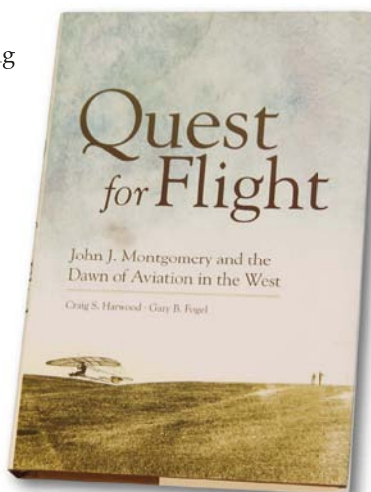
Quest for Flight: John J. Montgomery and the Dawn of Aviation in the West

By Craig S. Harwood and Gary B. Fogel; University of Oklahoma Press, 2800 Venture Drive, Norman, Oklahoma 73069, USA; 6½in x 9¼in (159mm x 235mm); hardback; 254 pages, illustrated; US\$29.95. ISBN 978-0-80614-264-7

THE AUTHORS OF this book contend that "Inventors and aviators working west of the Mississippi at the turn of the 20th Century have not received the recognition they deserve", and more specifically that John J. Montgomery made the first controlled flights of a heavier-than-air craft in the Western Hemisphere in his 1883–84 monoplane glider. Readers should keep in mind the facts that Harwood is Montgomery's great-grandson, and that Fogel was the author of a history of soaring in San Diego, so some bias might have been expected in these pages, and it does indeed seem that historical perspectives have been distorted in Montgomery's favour.

Marcus Aurelius wrote: "A man does not sin by commission only, but often by omission", and that is the recurring problem here. With regard to Montgomery's early glider work, the authors have chosen to place their trust in the pioneer's later accounts from 1910 onwards, in which he claimed to have glided for 600ft (183m) in 1893, whereas Chanute recorded in his classic work of 1894, *Progress in Flying Machines*, after long conversations with Montgomery, that he had covered a mere 100ft (30m). There is no space here to challenge or examine many of the other contentious assertions and claims made on the pioneer's behalf by his champions, but suffice to say the evidence presented is selective and there is cause for wariness.

Similarly, although many American gliding enthusiasts regard John J. Montgomery with



adulation, and numerous memorials have been erected to him, the Wright brothers' gliding achievements overshadow anything accomplished by Montgomery and there is no hard evidence that anything he wrote or did had any significant impact on aviation's development. The claims made here regarding his prior invention of "wing warping" also fail to convince, largely through being too vague. Sadly, he had already been left behind by the time of the fairground-type demonstrations of his balloon-launched tandem-wing glider in 1905, which attracted great public attention but did little else, and his tragic death in a monoplane glider on October 31, 1911, is merely a sideline in aviation history.

Nonetheless, this is a generally informative and complete account of Montgomery's life, and as such it should be in the collection of any self-respecting student of early aviation.

PHILIP JARRETT

F-8 Crusader BuNo 149210 and its Drivers: The Amazing Tale of a U.S. Fighter Jet Throughout the Vietnam War

By Chris Monier; self-published, available in the UK from The Aviation Bookshop, 31–33 Vale Road, Royal Tunbridge Wells, Kent TN11 1BS, www.aviation-bookshop.com; 8½in x 11in (216mm x 280mm); hardback; 112 pages, illustrated; £24.99. ISBN 2-918-263-25-8

THIS UNUSUAL BOOK from France is aimed squarely at those interested in American naval aviation during the Vietnam conflict, and specifically the iconic Vought F-8 Crusader. It is a biography of one particular F-8E/J, BuNo 149210, from the time it joined the US Navy fleet in 1962 to its unusual ultimate fate. The author is a self-confessed Crusader fanatic, and his dedication shows throughout the book's 112 pages, which are crammed with colour images of this particular F-8 and the many aviators who flew it throughout its career in war and peace.

The book begins with a lengthy introduction and chronology, and has an interesting section detailing the carrier *USS Hancock* (CVA-19) and its Vietnam deployments; from 1964 to 1975 BuNo 149210 was included in six of the ship's nine south-east Asian deployments. The author

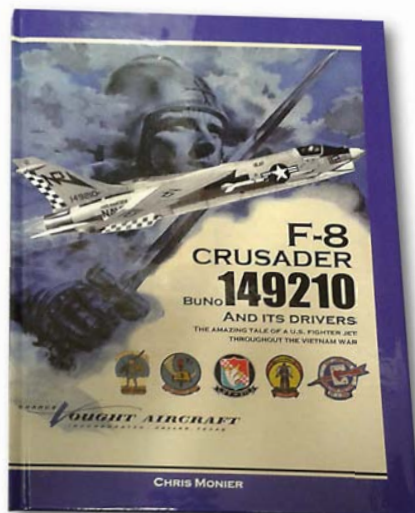
quickly establishes the format of presenting individual pilots of the aircraft, with photographs showing a particular pilot and his squadron mates, plus pages from his logbook detailing the flights he made in the Crusader.

The young fighter pilots' experiences are worth reading as they detail individual combat sorties, including several MiG-killing missions. Colour profile artworks and occasional sidebars add to the overall presentation. Readers who might not know the facts about the derivation of the slogan "When you're out of F-8s, you're out of fighters" will find the answer here. Also, the source of the quintessential fighter-pilot cry "Tally-ho!" also has a surprising explanation.

An unusual aspect of this aircraft's career is that it flew not only with the Navy but also the US Marine Corps. Those familiar with the air war in Vietnam will recognise several names throughout the book. Veterans of various squadrons will also delight in renewing their acquaintance with the many F-8 alumni shown.

Crusader BuNo 149210's time in the Navy carries through to its final deployments in 1975, after which it ended up in storage at the huge park at Davis-Monthan AFB in Arizona. But its unusual career did not end there. After being mothballed and sprayed with a Spraylat coating to protect it from the harsh desert sun, the veteran Crusader languished in Arizona until 1999, when a team of French officials visited the park to "harvest" parts for the ageing French F-8 fleet. One of the old warriors they selected was BuNo 149210, which was unceremoniously cut up and shipped to France, where the Crusader's story took an unusual turn when Chris Monier was able to buy the forward fuselage, by that time in a somewhat advanced state of decay.

Undaunted, the young enthusiast spent



long hours restoring the unique artefact, researching and buying individual small parts to bring the cockpit and fuselage almost up to former operational standard. Finally, work was completed and Monier was ready to place his treasure in a most unusual place — the outside wall of his house. His efforts even garnered a letter of appreciation from the Vought Aircraft Corporation saluting his dedication and persistence in restoring the truncated F-8. He ends his book with a salute to modellers, with a brief

discussion of kits that featured this particular bureau number.

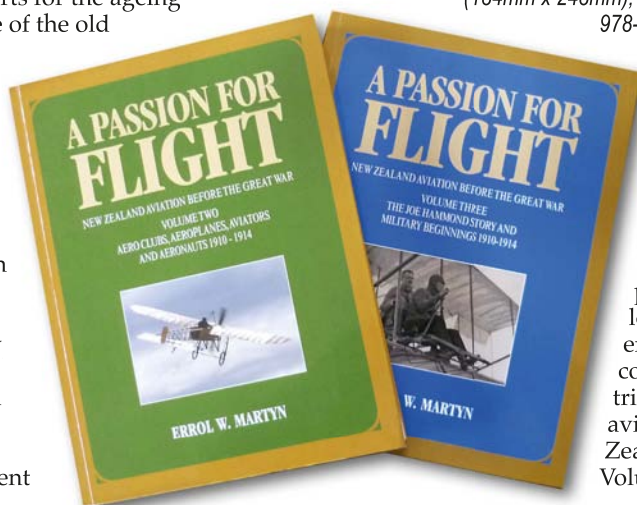
This is certainly one of the more unusual publications on aviation history, and particularly on Vietnam-era naval aviation, but it has been put together with the same care and attention its author applied to his singular restoration project.

PETER B. MERSKY

A Passion for Flight: New Zealand Aviation Before the Great War **Volume 2: Aero Clubs, Aeroplanes, Aviators and Aeronauts, 1910–1914** **Volume 3: The Joe Hammond Story and Military Beginnings, 1910–1914**

By Errol W. Martyn; Volplane Press, PO Box 6482, Upper Riccarton, Christchurch 8442, New Zealand; 7¼in x 9¼in (184mm x 248mm); both softback; Vol 2 (ISBN 978-0-473-24529-0) 320

pages (NZ\$52.90); Vol 3 (ISBN 978-0-473-26424-6) 208 pages (NZ\$44.90); both illustrated; plus NZ\$25 per book for UK delivery



THESE TWO well-presented, meticulously researched and entertaining volumes complete the author's trilogy on pioneer aviation in New Zealand. The thicker Volume 2 is a wide-

ranging and comprehensive survey of civil aviation in New Zealand and involving New Zealanders abroad.

Having in his first volume put paid to the long-running but ridiculous claims regarding the mythical pre-Wright flights of Richard Pearse [see pages 112–118 of this issue — Ed], the author has now had to deal with claims regarding Messrs Gill and Pither, both of whom are alleged to have made brief flights in 1910. Unfortunately, conclusive contemporary evidence is lacking in both cases, but their achievements receive impartial and careful consideration and fair assessment here. A surprising number of Kiwis tried to fly in primitive homebuilt aeroplanes and are well covered in this volume, but, as the author points out, truly practical powered flight did not become a reality in the country until 1913, and then by an American and an Australian using imported machines.

It is impossible in this review to cover everything encapsulated in this volume. Suffice it to say that accomplished flyers such as the Walsh brothers and Will Scotland share these pages with a gamut of also-rans, eccentric inventors, balloonists, parachutists and entrepreneurs, and their stories are supported by an impressive collection of illustrations, most of which will be new to the majority of readers. The sad story of New Zealand's first Blériot is also recounted.

The concluding third volume, again profusely illustrated, concentrates primarily on early military aviation activity in New Zealand and by New Zealanders abroad. The star is Joe Hammond, the nation's most prominent and successful aviator, who has more than 80 pages devoted to him, including his involvement with the Bleriot XI-2 *Britannia*, gifted to the army, and his wartime flying in Britain and the USA. The other prominent character is Alban Roberts, who devoted much of his life to experiments with radio-controlled airships and torpedoes, both in his native country and in the UK, and built and flew Australasia's first airship.

In addition the author describes the beginnings of military aviation in New Zealand and the careers of those of the nation's military pilots who served abroad. Other chapters are devoted to some rather unconventional proposals for military aircraft, and to those who volunteered to serve in the "Aerial Corps" in 1913.

Both volumes contain some updating amendments to Volume 1, good chapter notes and a full index. The special offer of a ten per cent discount for those ordering a set of three volumes or any other combination of three or more books is well worth taking up.

PHILIP JARRETT



BOOKS IN BRIEF

A quick round-up of what else is available for the aviation history enthusiast . . .

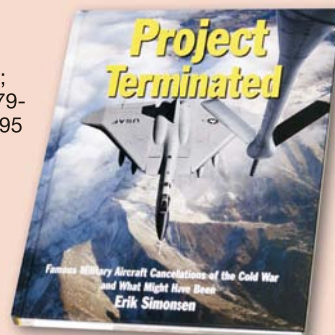


THE BIG BOOK OF FLIGHT
Rowland White
Bantam Books;
ISBN 978-0-59307-031-4; RRP £20

An excellent primer for the fledgling aviation enthusiast from the author of *Vulcan 607* and *Phoenix Squadron*. It's great fun for adults too.

PROJECT TERMINATED
Erik Simonsen
Crécy Publishing;
ISBN 978-0-85979-173-1; RRP £23.95

A fascinating in-depth look at some of the "what-ifs" of the Cold War period — includes copious superb digital artworks.

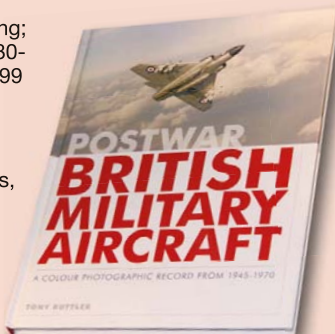


NO PARACHUTE
Arthur Gould Lee
Grub Street; ISBN 978-1-90916-604-2; RRP £14

A welcome and affordable reissue of the author's classic account of his experiences as a pilot during the Great War. This real-life "Biggles" story is a "must-have" for any self-respecting WW1 enthusiast.

POSTWAR BRITISH MILITARY AIRCRAFT
Tony Buttler
Midland Publishing;
ISBN 978-1-85780-329-7; RRP £19.99

More than 250 mouth-watering colour images of Cold War classics, with a narrative from the ever-dependable Tony Buttler. A bargain for less than £20.



Lost & Found

PHILIP JARRETT explores the lesser-known corners of aviation history, discovering unknown images and rediscovering long-lost details of aircraft, people and events. Here he reveals more on that mysterious rotary engine, and asks for help in identifying an airfield

THE ENIGMATIC ROTARY engine featured in *Lost & Found* in *TAH5* elicited a response from Karl Ludvigsen of Bury St Edmunds, Suffolk, who draws attention to two British patents applied for in 1915 that provide information on the operating principle behind this curious eight-cylinder, six-stroke engine. The first patent, No 11543, applied for on August 10, 1915, by Joseph Seward Ruston and Alan Ernest Leofric Chorlton and accepted on August 10, 1916, relates to “six or more stroke cycle engines”, and describes an engine that has eight or more radial cylinders driving a single crank on a shaft “which revolves in the opposite direction to the cylinders at a speed at least twice as great”. When the speed is only twice as great, the cycle is a six-stroke one, and the firing in an eight-cylinder six-stroke engine occurs successively in every third cylinder. Power can be taken off either the shaft or the cylinders.

The second patent, No 16975, applied for by the same two gentlemen on December 2, 1915, and accepted on March 27, 1919, relates to a system in six-stroke-cycle compression engines in which the

cylinders are cooled by drawing in and expelling air during the two strokes following the exhaust stroke, whereby “the rejected air from one cylinder is used for the formation of the charge in another cylinder. In a rotary engine the ordinary four-stroke cycle is followed in each cylinder by drawing in air through valves and rejecting it wholly or in part, to an adjacent cylinder which has almost completed its suction stroke”. A variation is also described whereby, in an engine with eight radial cylinders, “each cylinder discharges its cooling air into a cylinder next but one thereto”. Other variations are also described. We still have no more information on whether the actual engine was tested and, if so, what the results were.

An anonymous airfield

Here is another puzzle. I recently acquired the nice view, **BELOW**, of an airfield photographed from a Maurice Farman Longhorn biplane, probably about 1914. I do not know whether it was in the UK or Europe, but as it is printed on a British postcard I suspect it was in the UK. Can anyone pinpoint the location?



In the Shadow of the Tower

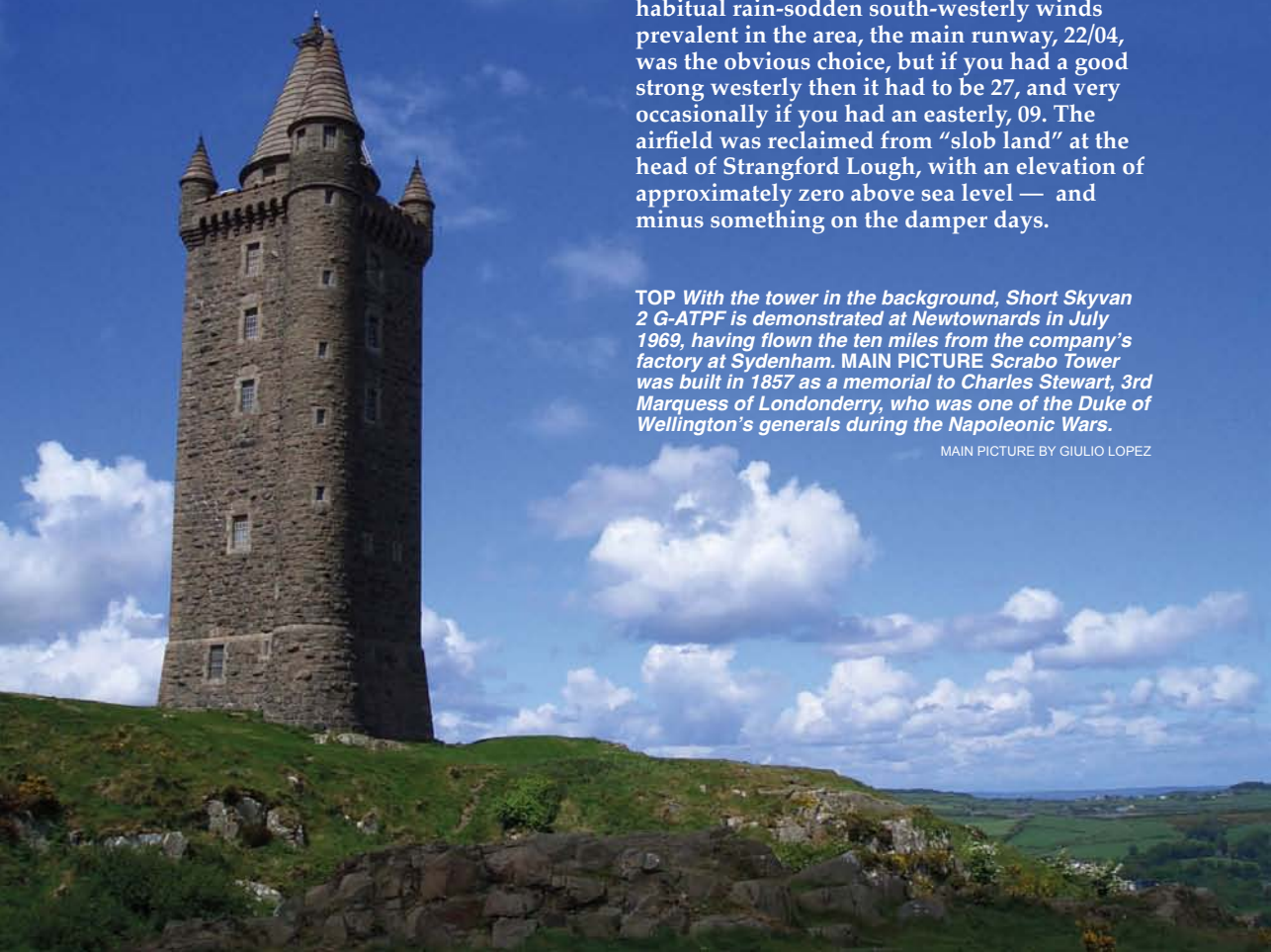


Anyone who has flown from Newtownards in Northern Ireland will be all-too-familiar with Scrabo Tower, the imposing 19th-Century landmark that stands sentinel over the airfield that nestles in its shadow 650ft below. **GRAHAM SKILLEN** recalls the challenges of flying from one of the UK's more adventurous airfields

SHOULD YOU BE flying near the sunny uplands of Newtownards in Ulster, Northern Ireland, you will surely not miss Scrabo Tower. As advertised, it towers over the airfield and provides a picturesque backdrop for your snaps. It undoubtedly provided an interesting challenge to the people who laid out the runways during the Second World War; they decided on a main runway that ran parallel to the nearby Newtownards—Comber road, part of the pre-war TT motorcycle course, and two other shorter runways with Scrabo Hill in the angle between them. So, considering the habitual rain-sodden south-westerly winds prevalent in the area, the main runway, 22/04, was the obvious choice, but if you had a good strong westerly then it had to be 27, and very occasionally if you had an easterly, 09. The airfield was reclaimed from “slob land” at the head of Strangford Lough, with an elevation of approximately zero above sea level — and minus something on the damper days.

TOP With the tower in the background, Short Skyvan 2 G-ATPF is demonstrated at Newtownards in July 1969, having flown the ten miles from the company's factory at Sydenham. MAIN PICTURE Scrabo Tower was built in 1857 as a memorial to Charles Stewart, 3rd Marquess of Londonderry, who was one of the Duke of Wellington's generals during the Napoleonic Wars.

MAIN PICTURE BY GIULIO LOPEZ





I had flown from there since my teens and one day, flush with earnings, I decided to try my hand with a recently-arrived Piper PA-22 Colt, registered G-ARNH. I'd been brought up on low-wing aircraft, so the concept of flying a high-wing type with no view and no cushion on flare was something new to be experienced. My instructor for the day was Thompson Boyes, a thin-faced lank-haired instructor of, in my opinion, a slightly nervous disposition, but nevertheless a kindly soul. I'd not flown with him before so he didn't know my flying abilities particularly well. It was one of the rare days with a good strong easterly, so we were on 09 — the interesting runway where one was landing "over the shoulder" of Scrabo Hill with the imposing tower immediately on your left when about a mile from touchdown. This also meant that there was a hefty updraught on finals that made it somewhat tricky, although one tended to skirt the hill a little with a kinked

ABOVE An aerial view of Newtownards looking west. The tricky short runway, 09/27, is orientated towards the camera, with the number 27 just visible on the threshold. The Ulster Flying Club hangar is centre-right in the foreground and the building right of centre was once used by Miles to build Messengers.

approach to offset this. The obstacle gradient was about eight per cent, so 3° (five per cent) approaches were not possible. If you were deep, even with the engine at idle, you could easily overshoot the threshold.

Wrangling the Colt

So off we set, down the runway, with the hill behind us and into the circuit, Thompson shuffling nervously in the right-hand seat and fidgeting with everything in the cockpit while giving me the necessary spiel. My first approach wasn't bad — I'd flown here before in other types, so I was pretty happy to touch down before the intersection, with 1,000ft (600m) to go.



ABOVE Piper PA-22 Colt G-ARNH, as flown by the author, with Stu Waring at the controls. Although the author managed to keep it in one piece when flying it, it was eventually damaged beyond repair at Blackbushe in September 1972. **BELOW LEFT** Saro Skeeter XN350 gives a nod towards Scrabo Tower in August 1966.

Before I had time to decide whether to roll out or go around, Thompson banged open the throttle and hauled back on the stick. No "I have control" or "go-around, please". At this point, while he might already have been feeling edgy, I was more than a little unnerved as well. Twitter-twitter from Thompson — "Wasn't room to stop, judgment" etc etc. Right, Skillen, try harder.

This doesn't always produce a better result, so my next approach into the updraught and contour trip down Scrabo Hill put my touch-down just past the intersection, deeper than my first attempt. Logic was telling me that if Thompson wanted me to go around last time, this time it was even more necessary, so, as I touched the throttle to open it up, he grabbed the brake and

we skittered to a halt feet from the seawall at the other end of the runway.

Did I mention the seawall? As well as the hill at one end of the runway, there was a 10ft (3m) seawall at the upwind other end, which would do your undercarriage no good at all in the case of a late go-around. Mounted on the seawall, atop an old pillbox, was the tailboom from Miles Aerovan G-AGWO supporting the windsock (as seen **BELOW RIGHT**), clearly the product of an earlier "event". At this point I was thoroughly confused, but backtracked and did a further circuit to Thompson's satisfaction. I taxied back to the clubhouse, dropped him off and went out to perform more circuits to calm myself down.

I never flew with Thompson Boyes again and





ABOVE Leopard Moth G-ACLL is refuelled at Newtownards in June 1964. The elephant was going to be photographed in the Skyvan seen in the background to highlight the latter's capacity — but Nellie had other ideas.
BELOW With control column in hand, Scottish entertainer Jimmy Logan climbs from a Tiger Moth at Newtownards.

neither did I ever fly another Colt. Some years later Thompson made the headlines as he was the charter helicopter pilot who had a gun put to his head and was forced to fly three prisoners out of Mountjoy prison in Dublin. I've often wondered how his nerves stood up to that one.

The more benign Runway 27?

Operating on Runway 27 with a take-off towards the hill the situation was reversed, with a healthy downdraught forcing you downwards as you contour-flew up the hill. It was probably most exciting in the Tiger Moth. The Ulster Flying Club's example in the early 1960s was G-AOUR, which was hired occasionally by Short Brothers' Guided Weapons Division, to check

out radio altimeters for use in its products.

It was all rather hush-hush, but a permanent mounting-plate was fitted under each wing to hold the rad-alt sensor when one was fitted for trials flying. At quarter-chord on the mainspar the plate protruded a few inches, being similar to a glider airbrake and with the same effect. So on the days when dear old 'OUR' was being used for club flying it was very poor value if you wanted to do aerobatics, as it took 20 very expensive minutes to get to 4,000ft (1,220m) before you could even start. Take-off on the grass beside the short runway was entertaining, and your blood pressure remained reasonable if you put in a dogleg at 200ft (60m) and crept round the hill. Landing towards the hill had its challenges as the old girl didn't have brakes and you bounced through the grass with the stick hard back, going tum-ti-tum-ti-tum with the fence rapidly approaching and no go-around option.

At the flying club there was never a whacking great notice in flight planning saying "Watch it if you're given 09/27", so on the days when a visiting pilot headed that way we would tramp out to watch his departure. One day an RAF Avro Anson lined up on 27 and took off — it was like a moth pinned to a board.

One day, in a fit of teenage arrogance, I took off over the hill in a Chipmunk when it was blowing a gale. With very low groundspeed and lots of flap, however, I was able to turn a bit right and go out over the top of the tower, some 650ft (200m) above the runway. Silly so-and-so!



VIA GUY WARNER / ULSTER AVIATION SOCIETY




AUTHOR'S PHOTOGRAPHS

OFF THE BEATEN TRACK

Ever turned a corner to find something unexpected? The Aviation Historian's intrepid aeronautical explorer **PETER DAVISON** investigates the stories behind the oddities that turn up in the most unusual places

SOME 60 MILES west of Shanghai lies the Oriental Green Boat Park, a technology-themed resort. At its centre is a lake on which is positioned a full-size replica aircraft carrier. A selection of Chinese military aircraft types is also displayed nearby.

The replica carrier's hangar deck contains a display of military vehicles, but the "flight deck" above it boasts a collection of military aircraft including two Shenyang JJ-6s (locally-built MiG-19 derivatives) and six Nanchang Q-5 Fantan ground-attack aircraft, plus a Mil Mi-8 helicopter.

The more streamlined Q-5 was based on the J-6 but featured wing-root intakes. Early versions date from 1965 although various upgrades have continued into the 21st Century. Initially suffering from poor range and performance, the Q-5 has evolved into many variants, including the Q-5A, an example of which delivered one of China's early air-launched nuclear weapons in January 1972. The type also saw service with Pakistan and is still used operationally by Bangladesh, Burma and Sudan, although large numbers have now been withdrawn from Chinese service. 

ABOVE A study in grey — Nanchang Q-5 Fantan "30381" leads the charge aboard the bizarre concrete carrier replica at the Oriental Green Boat Park, west of Shanghai, photographed in September 2013. To see the park and its extraordinary exhibit from above, put co-ordinates N31.105061, E121.014196 into the "Fly to" box in Google Earth.

BELOW The Mil Mi-8 helicopter and three camouflaged Fantans aboard the replica carrier's "flight deck". Further south at Yantian, Q-5s may also be seen displayed on the former Soviet carrier Minsk.



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The "Flying W" in Canada Peter Marshall takes an in-depth look at the Canadian career of the Aircruiser, Bellanca's invaluable single-engined 1930s workhorse



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